Design-Build Request for Proposal

Design and Construction for Pine Bluff Arsenal (PBA) Access Control Point (ACP) – Plainview Gate

White Hall | Arkansas

Solicitation **W9127S26RA057**

Design-Build Request for Proposal (D-B RFP)
18 May 2026

D-B RFP

US Army Corps of Engineers
Little Rock District

US Army Corps of Engineers

Little Rock District

Design-Build Request For Proposal

DESIGN AND CONSTRUCTION FOR
Pine Bluff Arsenal (PBA) Access Control Point (ACP) – Plainview Gate

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DESIGN-BUILD REQUEST FOR PROPOSAL (D-B RFP)
DESIGN AND CONSTRUCTION FOR PINE BLUFF ARSENAL ACCESS CONTROL POINT

PROJECT TABLE OF CONTENTS

DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS

TO BE PROVIDED BY GOVERNMENT

DIVISION 01 – GENERAL REQUIREMENTS

01 00 50	FORMS AND ATTACHMENTS
01 11 00	STATEMENT OF WORK
01 14 00	WORK RESTRICTIONS
01 20 00	PRICE AND PAYMENT PROCEDURES
01 30 00	ADMINISTRATIVE REQUIREMENTS
01 32 01.00 10	PROJECT SCHEDULE
01 33 00	SUBMITTAL PROCEDURES
01 33 16.00 10	DESIGN DATA (DESIGN AFTER AWARD)
01 33 29	SUSTAINABILITY REQUIREMENTS AND REPORTING
01 35 10.00 46	SPECIAL PROJECT PROCEDURES FOR PINE BLUFF ARSENAL
01 35 26	GOVERNMENTAL SAFETY REQUIREMENTS
01 35 29.13	HEALTH, SAFETY AND EMERGENCY RESPONSE PROCEDURES FOR CONTAMINATED SITES
01 42 00	SOURCES FOR REFERENCE PUBLICATIONS
01 45 00	QUALITY CONTROL
01 45 00.15 10	RESIDENT MANAGEMENT SYSTEM CONTRACTOR MODE (RMS CM)
01 45 35	SPECIAL INSPECTIONS
01 50 00	TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS
01 57 19	TEMPORARY ENVIRONMENTAL CONTROLS
01 58 00	PROJECT IDENTIFICATION
01 74 19	CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL
01 78 00	CLOSEOUT SUBMITTALS
01 78 23	OPERATION AND MAINTENANCE DATA
01 91 00.15	BUILDING COMMISSIONING

DIVISION 02 – EXISTING CONDITIONS

02 41 00	DEMOLITION AND DECONSTRUCTION
02 81 00	TRANSPORTATION AND DISPOSAL OF HAZARDOUS MATERIALS
02 82 00	ASBESTOS REMEDIATION
02 83 00	LEAD REMEDIATION

APPENDICES

APPENDIX A	BRIDGING DRAWINGS
APPENDIX B	GEOTECHNICAL REPORT
APPENDIX C	HAZMAT SURVEY REPORT

APPENDIX D	THREAT CALCULATIONS
APPENDIX E	PBA INSTALLATION PLANNING STANDARDS
APPENDIX F	USACE HIGH PERFORMANCE SUSTAINABILITY BUILDING (HPSB) CHECKLISTS
APPENDIX G	DRAFT 34 75 13.13 CRASH RATED ACTIVE VEHICLE BARRIERS AND CONTROLS
APPENDIX H	PINE BLUFF ARSENAL ACP STUDY
APPENDIX I	FIRE HYDRANT FLOW TEST
APPENDIX J	UPDATED CENTER OF STANDARDIZATION ARMY ACP STANDARD DESIGN DRAWINGS
APPENDIX K	ARMY ACP STANDARD DESIGN MANUAL
APPENDIX L	ARMY STANDARD FOR ACCES CONTROL POINTS
APPENDIX M	ORIGINAL PLANNING CHARRETTE DD1391s
APPENDIX N	LIFE CYCLE COST ANALYSIS (LCCA)
APPENDIX O	DRAINAGE REPORT
APPENDIX P	CYBERSECURITY CONTROLS
APPENDIX Q	AS-BUILT DRAWINGS FOR EXISTING BUILDINGS

--End of Table of Contents--

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DIVISION 01

GENERAL REQUIREMENTS

SECTION 01 00 50

FORMS AND ATTACHMENTS
03/12

PART 1 GENERAL

Listed below, and attached at the end of this section, are forms and attachments referred to in to other parts of the technical specifications.

1.1 SUBMITTAL REGISTER

In this section.

1.2 TRANSMITTAL FORM (ENG FORM 4025-R)

See Section 01 33 00 SUBMITTAL PROCEDURES

1.3 ACTIVITY HAZARD ANALYSIS (AHA)

See Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS

1.4 ACCIDENT INVESTIGATION REPORT (ENG FORM 3394)

See Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS

1.5 SWL FORM 463

See Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS

1.6 OSHA FORM 300 & 301

See Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS

1.7 RMS MONTHLY INJURIES-ILLNESSES & EXPOSURE

See Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS

1.8 SAFETY PERFORMANCE SIGN

See Section 01 14 00.00 46 WORK RESTRICTIONS

1.9 PROJECT IDENTIFICATION SIGN

See Section 01 14 00.00 46 WORK RESTRICTIONS

1.10 USACE-LITTLE ROCK DISTRICT NATIONAL BACKGROUND SCREENING CONSENT/RELEASE FORM (SSCI-2013)

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used

-- End of Section --

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
PBAACPDB RFP

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		01 14 00	SD-01 Preconstruction Submittals															
			List of Contact Personnel	1.4.1.1														
			SD-07 Certificates															
			3Rs Explosive Safety Education	1.11.1														
			Training Certificate															
		01 30 00	SD-01 Preconstruction Submittals															
			View Location Map	1.4														
			Progress and Completion	1.5														
			Pictures															
			SD-04 Samples															
			Color Boards	1.3	G													
		01 32 01.00 10	SD-01 Preconstruction Submittals															
			Project Scheduler Qualifications	1.3	G													
			Preliminary Project Schedule	3.4.1	G													
			Initial Project Schedule	3.4.2	G													
			Periodic Schedule Update	3.6.2	G													
		01 33 00	SD-01 Preconstruction Submittals															
			Submittal Register	1.8	G													
		01 33 29	SD-01 Preconstruction Submittals															
			Preliminary High Performance	1.5.3.2	G													
			and Sustainable Building Checklist															
			Sustainability Action Plan	1.4.1	G													
			Preliminary Sustainability	1.5.3.2	G													
			eNotebook															
			SD-05 Design Data															

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
PBAACPDB RFP

CONTRACTOR

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		01 33 29	Interim Design High Performance	1.5.3.2	G													
			and Sustainable Building Checklist															
			Interim Design Sustainability	1.5.3.2	G													
			eNotebook															
			Final Design High Performance	1.5.3.2	G													
			and Sustainable Building Checklist															
			Final Design Sustainability	1.5.3.2	G													
			eNotebook															
			SD-06 Test Reports															
			Third-Party Certification Design	1.5.3.2	G													
			Compliance Report															
			SD-11 Closeout Submittals															
			Final High Performance and	1.5.3.2	G													
			Sustainable Building Checklist															
			Final Sustainability eNotebook	1.5.3.2	G													
			Amended Final Sustainability	1.5.3.2	G													
			eNotebook															
			Amended Final High	1.5.3.2	G													
			Performance and Sustainable															
			Building Checklist															
		01 35 26	SD-01 Preconstruction Submittals															
			Accident Prevention Plan (APP)	1.8.1	G													
			Design															
			Accident Prevention Plan (APP)	1.8.2	G													
			Construction															
			SD-06 Test Reports															

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
PBAACPDB RFP

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		01 35 26	Accident Reports	1.12.2	G													
			LHE Inspection Reports	1.12.3														
			Monthly Exposure Reports	1.5	G													
			SD-07 Certificates															
			Activity Hazard Analysis (AHA)	1.9	G													
			Certificate of Compliance	1.12.4														
			Hot Work Permit	1.13														
			License Certificates	1.14														
			Portable Gauge Operations	1.14.1	G													
			Planning Worksheet															
			Radiography Operation Planning	1.14.1	G													
			Work Sheet															
			Standard Lift Plan	1.12.4.2	G													
			Critical Lift Plan	1.12.4.2	G													
		01 35 29.13	SD-02 Shop Drawings															
			Work Zones	3.9.1	G													
			Decontamination Facilities	3.10.1	G													
			SD-03 Product Data															
			Amendments to the APP/SSHP	1.4	G													
			Exposure Monitoring/Air	3.5														
			Sampling Program															
			Site Control Log	3.9.2														
			SSHO's Daily Inspection Logs	1.8														
			SD-07 Certificates															
			Certificate Of Worker/Visitor	1.7														
			Acknowledgement															

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
PBAACPDB RFP

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAG# RAPH	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		01 35 29.13	SD-11 Closeout Submittals															
			Safety And Health Phase-Out Report	1.9	G													
		01 45 00	SD-01 Preconstruction Submittals															
			Contractor Quality Control (CQC) Plan	1.5.2	G													
			Additional Requirements For Design Quality Control (DQC) Plan	1.5.2.2	G													
			SD-05 Design Data															
			Design Quality Control	1.12.2														
			Discipline-Specific Checklists	1.5.2.2														
			SD-06 Test Reports															
			Verification Statement	1.12.3														
			SD-07 Certificates															
			Certificate Of Readiness	1.6.7.1	G													
		01 45 35	SD-01 Preconstruction Submittals															
			Written NDT Practices	3.1.2														
			SD-06 Test Reports															
			Special Inspection Daily Reports	3.1.1														
			Special Inspection Daily Reports	3.1.2														
			Special Inspection Biweekly Reports	3.1.1														
			SD-07 Certificates															
			AISC Certified Steel Fabricator	2.1														
			AC472 Accreditation	2.1														
			Certificate of Compliance	2.1														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
PBAACPDB RFP

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		01 45 35	Special Inspector	1.5	G													
			Qualification Records for	3.1.2														
			Nondestructive Testing															
			Technicians															
			SD-11 Closeout Submittals															
			Interim Report	3.1.2	G													
			Comprehensive Final Report	3.1.2	G													
			Final Report	3.1.3	G													
		01 50 00	SD-01 Preconstruction Submittals															
			Construction Site Plan	1.3	G													
			Traffic Control Plan	3.3.1	G													
			Haul Road Plan	2.2.1	G													
			Contractor Computer	1.6.1.4														
			Cybersecurity Compliance															
			Statements															
			Contractor Temporary Network	1.6.6														
			Cybersecurity Compliance															
			Statements															
			SD-06 Test Reports															
			Backflow Preventer Tests	3.4														
			SD-07 Certificates															
			Backflow Tester	1.4.1														
			Backflow Preventers	1.4														
		01 57 19	SD-01 Preconstruction Submittals															
			Preconstruction Survey	1.6.1														
			Regulatory Notifications	1.6.2														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
PBAACPDB RFP

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		01 57 19	Environmental Manager	1.6.4														
			Qualifications															
			Employee Training Records	1.6.5														
			Environmental Protection Plan	1.7	G													
			Dirt and Dust Control Plan	1.7.9.1														
			Solid Waste Management Permit	1.11														
			Stormwater Pollution Prevention	3.2.1.1	G													
			Plan															
			Stormwater Notice of Intent	3.2.1.2														
			Spill Prevention Control And	3.15.2	G													
			Countermeasure (SPCC) Plan															
			SD-06 Test Reports															
			Monthly Solid Waste Disposal	1.11.1	G													
			Report															
			Inspection Reports	3.2.1.3														
			SD-07 Certificates															
			Employee Training Records	1.6.5	G													
			Erosion and Sediment Control	1.6.5														
			Inspector															
			Certificate of Competency	1.6.5.1														
			SD-11 Closeout Submittals															
			Regulatory Notifications	1.6.2	G													
			Assembled Employee Training	1.6.5	G													
			Records															
			Solid Waste Management Permit	1.11	G													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
PBAACPDB RFP

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		01 57 19	Stormwater Pollution Prevention	3.2.1.4	G													
			Plan Compliance Notebook															
			Stormwater Notice of Termination	3.2.1.5	G													
			As-Built Topographic Survey	3.2.1.5														
			Waste Determination	3.7.1	G													
			Documentation															
			Project Solid Waste Disposal	3.7.2.1	G													
			Documentation Report															
			Sales Documentation	3.7.2.1	G													
			Contractor Certification	3.7.2.1														
			Hazardous Waste/Debris	3.7.3.1	G													
			Management															
			Disposal Documentation for	3.7.3.6	G													
			Hazardous and Regulated Waste															
		01 58 00	SD-02 Shop Drawings															
			Sign Legend Orders	1.3.1	G	AO												
		01 74 19	SD-01 Preconstruction Submittals															
			Construction Waste Management	1.7	G													
			Plan															
			SD-06 Test Reports															
			Quarterly Reports	1.9.2														
			Annual Report	1.9.3														
			SD-11 Closeout Submittals															
			Final Construction Waste	1.10	S													
			Diversion Report															
		01 78 00	SD-03 Product Data															

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
PBAACPDB RFP

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		01 78 00	Warranty Tags	1.7.5														
			Spare Parts Data	1.5														
			Warranty Management Plan	1.7.1														
			SD-08 Manufacturer's Instructions															
			Instructions	1.7.1														
			SD-10 Operation and Maintenance															
			Data															
			Operation and Maintenance	3.7	G													
			Manuals															
			SD-11 Closeout Submittals															
			As-Built Drawings	3.1	G													
			Record Drawings	3.3	G													
			As-Built Record of Equipment	3.6														
			and Materials															
			Warranted Equipment and	1.7.1														
			Materials															
			Final Approved Shop Drawings	3.4	G													
			Construction Contract	3.5	G													
			Specifications															
			Certification of EPA Designated	2.2	G													
			Items															
			Interim DD FORM 1354	3.9.1	G AO													
			High Performance and	3.9.2	G													
			Sustainable Building (HPSB)															
			Checklist															

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
PBAACPDB RFP

CONTRACTOR

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		01 78 00	List Of Installed Building	3.9.2														
			Equipment Items For DD Form															
			1354															
		01 78 23	SD-10 Operation and Maintenance															
			Data															
			Facility Data Workbook	1.4	G													
			Training Plan	3.1.1	G													
			Training Outline	3.1.3	G													
			Training Content	3.1.2	G													
			Operation And Maintenance	3.2.1	G													
			Manual, Progress Submittal															
			Operation And Maintenance	3.2.2	G													
			Manual, Prefinal Submittal															
			Operation And Maintenance	3.2.3	G													
			Manual, Final Submittal															
			SD-11 Closeout Submittals															
			Training Video Recording	3.1.4	G													
			Validation of Training Completion	3.1.6	G													
			Training Plan	3.1.1	G													
			Record Drawings And Utility	1.6.6.7	G													
			Systems															
		01 91 00.15	SD-06 Test Reports															
			Completed Construction	3.6	G													
			Observation Checklists															
			Interim Construction Phase	3.4	G													
			Commissioning Plan															

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
PBAACPDB RFP

CONTRACTOR

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		01 91 00.15	Final Construction Phase	3.4	G													
			Commissioning Plan															
			Issues Log	1.10	G													
			SD-07 Certificates															
			Commissioning Firm	1.8	G													
			Certificate of Readiness	1.11	G													
			SD-10 Operation and Maintenance															
			Data															
			Maintenance and Service Life	3.10	G													
			Plan															
			Systems Manual	3.9	G													
			SD-11 Closeout Submittals															
			Final Commissioning Report	3.11	G													
			Final Commissioning Report	3.12	G													
		02 41 00	SD-01 Preconstruction Submittals															
			Demolition Plan	1.2.2	G													
			Deconstruction Plan	1.2.2	G													
			Existing Conditions	1.10														
			SD-07 Certificates															
			Notification	1.7	G													
		02 81 00	SD-03 Product Data															
			Packaging Notifications	2.1.1														
			Hazardous Waste Management	3.1	G													
			Plan															
			Onsite Hazardous Waste	3.2	G													
			Management															

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
PBAACPDB RFP

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		02 81 00	Notices of Non-Compliance and	3.3														
			Notices of Violation															
			SD-06 Test Reports															
			Recordkeeping	3.8	G													
			Exception Report	3.8	G													
			Spill Response	3.9														
			SD-07 Certificates															
			Transportation and Disposal	1.4.1	G													
			Coordinator															
			Training	1.4.2	G													
			Pipeline Hazardous Materials	1.4.3														
			Safety Administration Certification															
			Shipping Documents and	3.3.3	G													
			Packagings Certification															
			Security Plan	3.3.4														
			Certificates of Disposal	3.3.5														
			Waste Minimization	3.7														
		02 82 00	SD-03 Product Data															
			Amended Water	1.2.1	G													
			Safety Data Sheets (SDS) for All	1.3.9	G													
			Materials															
			Encapsulants	2.1	G													
			Respirators	3.1.2.1	G													
			Local Exhaust Equipment	3.1.7	G													
			Pressure Differential Automatic	3.1.7	G													
			Recording Instrument															

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
PBAACPDB RFP

CONTRACTOR

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(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		02 82 00	Vacuums	3.1.8	G													
			Glovebags	3.1.10	G													
			SD-06 Test Reports															
			Air Sampling Results	1.5.5	G													
			Pressure Differential Recordings	1.5.6	G													
			for Local Exhaust System															
			Encapsulation Test Patches	3.2.12.2	G													
			Clearance Sampling	3.2.14.5	G													
			Asbestos Disposal Quantity	3.3.3.2	G													
			Report															
			SD-07 Certificates															
			Employee Training	1.3.4	G													
			Notifications	1.3.5	G													
			Respiratory Protection Program	1.3.7	G													
			Asbestos Hazard Abatement	1.3.10	G													
			Plan															
			Testing Laboratory	1.3.11	G													
			Landfill Approval	1.3.12	G													
			Delivery Tickets	1.3.12	G													
			Waste Shipment Records	1.3.12	G													
			Transporter Certification	1.3.13	G													
			Medical Certification	1.3.14	G													
			Private Qualified Person	1.5.1	G													
			Documentation															
			Designated Competent Person	1.5.2	G													
			Worker's License	1.5.3	G													

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(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		02 82 00	Contractor's License	1.5.4	G													
			Federal, State or Local Citations	1.5.7	G													
			on Previous Projects															
			Encapsulants	2.1	G													
			Equipment Used to Contain	3.1	G													
			Airborne Asbestos Fibers															
			Water Filtration Equipment	3.1.3.3	G													
			Vacuums	3.1.8	G													
			Ventilation Systems	3.1.8	G													
			SD-11 Closeout Submittals															
			Permits and Licenses	1.3.5	G													
			Notifications	1.3.5	G													
			Respirator Program Records	1.3.7.1	G													
			Rental Equipment	1.7.1	G													
		02 83 00	SD-01 Preconstruction Submittals															
			Competent Person	1.5.1.1	G													
			Training Certification	1.5.1.2	G													
			Occupational and Environmental	1.5.2.3	G													
			Assessment Data Report															
			Medical Examinations	1.5.2.4	G													
			Lead, Cadmium, Chromium	1.5.2.8	G													
			Waste Management Plan															
			Licenses, Permits and	1.5.4	G													
			Notifications															
			Occupant Protection Plan	1.5.5	G													

SUBMITTAL REGISTER

CONTRACT NO.

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PBAACPDB RFP

CONTRACTOR

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(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		02 83 00	Lead, Cadmium, Chromium	1.5.2.2	G													
			Compliance Plan															
			Initial Sample Results	3.4.1.1	G													
			Written Evidence of TSD	3.5.2.1	G													
			Approval															
			SD-03 Product Data															
			Respirators	1.6.1	G													
			Vacuum Filters	1.6.4	G													
			Negative Air Pressure System	1.6.7	G													
			Materials and Equipment	2.1	G													
			Expendable Supplies	2.1.1	G													
			Local Exhaust Equipment	3.1.1.5	G													
			Pressure Differential Automatic	3.1.1.5	G													
			Recording Instrument															
			Pressure Differential Log	3.1.1.6	G													
			SD-06 Test Reports															
			Sampling and Analysis	1.3.3	G													
			Occupational and Environmental	1.5.2.3	G													
			Assessment Data Report															
			Sampling Results	1.5.2.3	G													
			Pressure Differential Recordings	1.5.3	G													
			For Local Exhaust System															
			SD-07 Certificates															
			Testing Laboratory	1.5.1.3	G													
			Third Party Consultant	1.5.1.4	G													
			Qualifications															

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
PBAACPDB RFP

CONTRACTOR

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(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		02 83 00	Occupant Notification	3.1.1.1	G													
			Notification of the	3.1.1.1	G													
			Commencement of LBP Hazard															
			Abatement															
			Clearance Certification	3.5.1.1	G													
			SD-11 Closeout Submittals															
			Hazardous Waste Manifest	3.5.2.1	G													
			Turn-In Documents or Weight	3.5.2.1	G													
			Tickets															
			Nonhazardous Manifest	3.5.2.1	G													
			Bill Of Lading	3.5.2.1	G													

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE

For use of this form, see ER 415-1-10; the proponent agency is CECW-CE.

DATE	TRANSMITTAL NO.

SECTION I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS (*This section will be initiated by the contractor*)

TO:	FROM:	CONTRACT NO.	CHECK ONE: ☐ THIS IS A NEW TRANSMITTAL ☐ THIS IS A RESUBMITTAL OF TRANSMITTAL _____

SPECIFICATION SEC. NO. (*Cover only one section with each transmittal*)	PROJECT TITLE AND LOCATION	THIS TRANSMITTAL IS FOR: (*Check one*) ☐ FIO ☐ GA ☐ DA ☐ CR ☐ DA/CR ☐ DA/GA

ITEM NO. (*See Note 3*)	DESCRIPTION OF SUBMITTAL ITEM (*Type size, model number/etc.*)	SUBMITTAL TYPE CODE (*See Note 8*)	NO. OF COPIES	CONTRACT DOCUMENT REFERENCE		CONTRACTOR REVIEW CODE	VARIATION Enter "Y" if requesting a variation (*See Note 6*)	USACE ACTION CODE (*Note 9*)
				SPEC. PARA. NO.	DRAWING SHEET NO.			
a.	b.	c.	d.	e.	f.	g.	h.	i.

REMARKS	I certify that the above submitted items had been reviewed in detail and are correct and in strict conformance with the contract drawings and specifications except as otherwise stated.	
	NAME OF CONTRACTOR	SIGNATURE OF CONTRACTOR

SECTION II - APPROVAL ACTION

ENCLOSURES RETURNED (*List by item No.*)	NAME AND TITLE OF APPROVING AUTHORITY	SIGNATURE OF APPROVING AUTHORITY	DATE

INSTRUCTIONS

1. Section I will be initiated by the Contractor in the required number of copies.

2. Each Transmittal shall be numbered consecutively. The Transmittal Number typically includes two parts separated by a dash (-). The first part is the specification section number. The second part is a sequential number for the submittals under that spec section. If the Transmittal is a resubmittal, then add a decimal point to the end of the original Transmittal Number and begin numbering the resubmittal packages sequentially after the decimal.

3. The "Item No." for each entry on this form will be the same "Item No." as indicated on ENG FORM 4288-R.

4. Submittals requiring expeditious handling will be submitted on a separate ENG Form 4025-R.

5. Items transmitted on each transmittal form will be from the same specification section. Do not combine submittal information from different specification sections in a single transmittal.

6. If the data submitted are intentionally in variance with the contract requirements, indicate a variation in column h, and enter a statement in the Remarks block describing he detailed reason for the variation.

7. ENG Form 4025-R is self-transmitting - a letter of transmittal is not required.

8. When submittal items are transmitted, indicate the "Submittal Type" (*SD-01 through SD-11*) in column c of Section I.
   Submittal types are the following:
   SD-01 - Preconstruction SD-02 - Shop Drawings SD-03 - Product Data SD-04 - Samples SD-05 - Design Data SD-06 - Test Reports
   SD-07 - Certificates SD-08 - Manufacturer's Instructions SD-09 - Manufacturer's Field Reports SD-10 - O&M Data SD-11 - Closeout

9. For each submittal item, the Contractor will assign Submittal Action Codes in column g of Section I. The U.S. Army Corps of Engineers approving authority will assign Submittal Action Codes in column i of Section I. The Submittal Action Codes are:

   A -- Approved as submitted.
   B -- Approved, except as noted on drawings. Resubmission not required.
   C -- Approved, except as noted on drawings. Refer to attached comments. Resubmission required.
   D -- Will be returned by separate correspondence.
   E -- Disapproved. Refer to attached comments.
   F -- Receipt acknowledged.
   X -- Receipt acknowledged, does not comply with contract requirements, as noted.
   G -- Other action required *(Specify)*
   K -- Government concurs with intermediate design. (*For D-B contracts*)
   R -- Design submittal is acceptable for release for construction. (*For D-B contracts*)

10. Approval of items does not relieve the contractor from complying with all the requirements of the contract.

U.S. Army Corps of Engineers (USACE)

ACTIVITY HAZARD ANALYSIS (AHA)

For use of this form, see EM 385-1-1; the proponent agency is CESO.

Purpose: The Activity Hazard Analysis is a tool used in the Risk Management Process. Risk management is a business process that includes the identification, assessment, and prioritizing of risks, followed by coordinated and economical application of resources to minimize, monitor, and control the probability and/or impact of unfortunate events to an acceptable level.

The overall residual risk assessment code (RAC) must be communicated and accepted by the proper approval authority before beginning the activity.

AHAs must be provided to, and reviewed by, all involved employees prior to starting the task. Each employee must document their review with a signature in the last section of form.

Activity: _____ **Date:** _____ **Overall RAC** (Use highest code) [ ]

Location: _____

Prepared By: _____

Reviewed By: _____

Notes: _____

Risk Assessment Code Matrix

E = Extremely High Risk
H = High Risk
M = Medium Risk
L = Low Risk

Severity	Probability: Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Moderate	H	M	M	L	L
Negligible	M	L	L	L	L

JOB STEPS		HAZARDS (Recognized/Anticipated)	CONTROLS (ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS)	RESIDUAL RAC

EQUIPMENT		TRAINING	INSPECTION

Involved Personnel:

PPE Required:

Approval Authority (*digital signature*)

PRINTED NAME:	PRINTED TITLE:
DIGITAL SIGNATURE:	DATE:

Approval Authority information is based on overall RAC according to EM 385-1-1, para 1-6 or 2-6, as applicable.

EMPLOYEE DOCUMENTATION SHEET

AHAs must be provided to and reviewed by all involved employees prior to starting the task. Each employee must document their review with a signature.

NAME	OCCUPATION / DESIGNATION (Job Title) / (Competent or Qualified Person)	SIGNATURE	DATE

PREVIOUS EDITIONS ARE OBSOLETE.

(For safety staff only)	REPORT NO.	EROC CODE	**UNITED STATES ARMY CORPS OF ENGINEERS** **ACCIDENT INVESTIGATION REPORT** For use of this form, see Help Menu and USACE Supplement to AR 385-40 The proponent agency is CESO	REQUIREMENT CONTROL SYMBOL: CEEC-S-8 *(R2)*

1. ACCIDENT CLASSIFICATION

PERSONNEL CLASSIFICATION	INJURY/ILLNESS/FATAL	PROPERTY DAMAGE		MOTOR VEHICLE INVOLVED	DIVING
GOVERNMENT ☐ CIVILIAN ☐ MILITARY	☐	☐ FIRE INVOLVED	☐ OTHER	☐	☐
☐ CONTRACTOR	☐	☐ FIRE INVOLVED	☐ OTHER	☐	☐
☐ PUBLIC ☐ FATAL ☐ OTHER				☐	

2. PERSONAL DATA

a. NAME *(Last, First MI.)*	b. AGE	c. SEX ☐ MALE ☐ FEMALE	d. SOCIAL SECURITY NUMBER	e. GRADE

f. JOB SERIES/TITLE	g. DUTY STATUS AT TIME OF ACCIDENT	h. EMPLOYMENT STATUS AT TIME OF ACCIDENT
	☐ ON DUTY ☐ TDY ☐ OFF DUTY	☐ ARMY ACTIVE ☐ ARMY RESERVE ☐ VOLUNTEER ☐ PERMANENT ☐ FOREIGN NATIONAL ☐ SEASONAL ☐ TEMPORARY ☐ STUDENT ☐ OTHER *(Specify)* _____

3. GENERAL INFORMATION

a. DATE OF ACCIDENT *(YYYYMMDD)*	b. TIME OF ACCIDENT *(Military Time)* hrs.	c. EXACT LOCATION OF ACCIDENT	d. CONTRACTOR'S NAME (1) PRIME (2) SUBCONTRACTOR

e. CONTRACT NUMBER	f. TYPE OF CONTRACT	g. HAZARDOUS/TOXIC WASTE ACTIVITY
_____ ☐ CIVIL WORKS ☐ MILITARY ☐ OTHER *(Specify)* _____	☐ CONSTRUCTION ☐ SERVICE ☐ A/E ☐ DREDGE ☐ OTHER *(Specify)* _____	☐ SUPERFUND ☐ DERP ☐ IRP ☐ OTHER *(Specify)*

4. CONSTRUCTION ACTIVITIES ONLY *(Fill in line and corresponding code number in box from list - see help menu)*

a. CONSTRUCTION ACTIVITY	(CODE) #	b. TYPE OF CONSTRUCTION EQUIPMENT	(CODE) #

5. INJURY/ILLNESS INFORMATION *(Include name on line and corresponding code number in box for items e, f & g - see help menu)*

a. SEVERITY OF ILLNESS/INJURY	(CODE) #	b. ESTIMATED DAYS LOST	c. ESTIMATED DAYS HOSPITALIZED	d. ESTIMATED DAYS RESTRICTED DUTY

e. BODY PART AFFECTED	(CODE) #	g. TYPE AND SOURCE OF INJURY/ILLNESS	(CODE) #
PRIMARY _____		TYPE _____	
SECONDARY _____	(CODE) #		(CODE)
		SOURCE _____	#

f. NATURE OF ILLNESS / INJURY	(CODE) #

6. PUBLIC FATALITY *(Fill in line and correspondence code number in box - see help menu)*

a. ACTIVITY AT TIME OF ACCIDENT	(CODE) #	b. PERSONAL FLOTATION DEVICE USED?
		☐ YES ☐ NO ☐ N/A

7. MOTOR VEHICLE ACCIDENT					
a. TYPE OF VEHICLE	b. TYPE OF COLLISION	c. SEAT BELTS	USED	NOT USED	NOT APPLICABLE
☐☐ PICKUP/VAN ☐☐ AUTOMOBILE ☐☐ TRUCK ☐☐ OTHER *(Specify)* _____	☐ SIDE SWIPE ☐ HEAD ON ☐ REAR END ☐ BROADSIDE ☐ ROLL OVER ☐ BACKING ☐ OTHER *(Specify)* _____	(1) FRONT SEAT	☐	☐	☐
		(2) REAR SEAT	☐	☐	☐

8. PROPERTY MATERIAL INVOLVED		
a. NAME OF ITEM	b. OWNERSHIP	c. AMOUNT OF DAMAGE
(1)		
(2)		
(3)		

9. VESSEL/FLOATING PLANT ACCIDENT *(Fill in line and correspondence code number in box from list - see help menu)*

a. ACTIVITY AT TIME OF ACCIDENT	(CODE)	a. ACTIVITY AT TIME OF ACCIDENT	(CODE)
_____	# ☐	_____	# ☐

10. ACCIDENT DESCRIPTION *(Use additional paper, if necessary, see attached page 4.)*

11. CAUSAL FACTOR*(s) (Read instructions before completing)*

a. *(Explain YES answers in item 13)*	YES	NO
DESIGN: Was design of facility, workplace or equipment a factor?	☐	☐
INSPECTION/MAINTENANCE: Were inspection & maintenance procedures a factor?	☐	☐
PERSON'S PHYSICAL CONDITION: In your opinion, was the physical condition of the person a factor?	☐	☐
OPERATING PROCEDURES: Were operating procedures a factor?	☐	☐
JOB PRACTICES: Were any job safety/health practices not followed when the accident occurred?	☐	☐
HUMAN FACTORS: Did any human factors such as, size or strength of person, etc., contribute to accident?	☐	☐
ENVIRONMENTAL FACTORS: Did heat, cold, dust, sun, glare, etc., contribute to the accident?	☐	☐
CHEMICAL AND PHYSICAL AGENT FACTORS: Did exposure to chemical agents, such as dust, fumes, mists, vapors or physical agents, such as, noise, radiation, etc., contribute to accident?	☐	☐
OFFICE FACTORS: Did office setting such as, lifting office furniture, carrying, stooping, etc., contribute to the accident?	☐	☐
SUPPORT FACTORS: Were inappropriate tools/resources provided to properly perform the activity/task?	☐	☐
PERSONAL PROTECTIVE EQUIPMENT: Did the improper selection, use or maintenance of personal protective equipment contribute to the accident?	☐	☐
DRUGS/ALCOHOL: In your opinion, was drugs or alcohol a factor to the accident?	☐	☐
b. WAS A WRITTEN JOB/ACTIVITY HAZARD ANALYSIS COMPLETED FOR TASK BEING PERFORMED AT TIME OF ACCIDENT? *(If yes, attach a copy.)*	☐	☐

12. TRAINING		
a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK?	b. TYPE OF TRAINING	c. DATE OF MOST RECENT FORMAL TRAINING *(YYYYMMDD)*
☐ YES ☐ NO	☐ CLASSROOM ☐ ON JOB	

13. FULLY EXPLAIN WHAT ALLOWED OR CAUSED THE ACCIDENT; INCLUDE DIRECT AND INDIRECT CAUSES *(See instruction for definition of direct and indirect causes.) (Use additional paper, if necessary)*

a. DIRECT CAUSE*(s) (Attach additional sheets as needed, See page 4)*

b. INDIRECT CAUSE*(s) (Attach additional sheets as needed, See page 5)*

14.	ACTION*(s)* TAKEN, ANTICIPATED OR RECOMMENDED TO ELIMINATE CAUSE*(s)*	
DESCRIBE FULLY *(Attach additional sheets as necessary, See page 5)*		
15.	DATES FOR ACTIONS IDENTIFIED IN BLOCK 14.	
a. BEGINNING *(YYYYMMDD)*		b. ANTICIPATED COMPLETION *(YYYYMMDD)*
c. DATE SIGNED *(YYYYMMDD)*	d. TITLE OF SUPERVISOR COMPLETING REPORT	e. CORPS SIGNATURE, SUPERVISOR COMPLETING REPORT
c. DATE SIGNED *(YYYYMMDD)*	d. TITLE OF SUPERVISOR COMPLETING REPORT	e. CONTRACTOR SIGNATURE, SUPERVISOR COMPLETING REPORT
f. ORGANIZATION IDENTIFIER *(Division, Branch, Section, etc.,)*		g. OFFICE SYMBOL
16.	MANAGEMENT REVIEW *(1st)*	
a. ☐ CONCUR b. ☐ NONCONCUR c. COMMENTS		
DATE *(YYYYMMDD)*	TITLE	SIGNATURE
17.	MANAGEMENT REVIEW *(2nd - Chief Operations, Construction, Engineering, etc.,)*	
a. ☐ CONCUR b. ☐ NONCONCUR c. COMMENTS		
DATE *(YYYYMMDD)*	TITLE	SIGNATURE
18.	SAFETY AND OCCUPATIONAL HEALTH OFFICE REVIEW	
a. ☐ CONCUR b. ☐ NONCONCUR c. ADDITIONAL ACTIONS/COMMENTS		
DATE *(YYYYMMDD)*	TITLE	SIGNATURE
19.	COMMAND APPROVAL	
COMMENTS		
DATE *(YYYYMMDD)*	COMMANDER SIGNATURE	

10. ACCIDENT DESCRIPTION *(Continuation)*

13a. DIRECT CAUSE*(s) (Continuation)*

13b. INDIRECT CAUSE*(s) (Continuation)*

14. ACTION*(s)* TAKEN, ANTICIPATED, OR RECOMMENDED TO ELIMINATE CAUSE*(s) (Continuation)*

GENERAL. Complete a separate report for each person who was injured, caused, or contributed to the accident *(excluding uninjured personnel and witnesses)*. Use of this form for reporting USACE employee first-aid type injuries not submitted to the Office of Workers' Compensation Programs *(OWCP)* shall be at the discretion of the FOA commander. Please type or print legibly. Appropriate items shall be marked with an "X" in box(es). If additional space is needed, provide the information on a separate sheet and attach to the completed form. Ensure that these instructions are forwarded with the completed report to the designated management reviewers indicated in sections 16 and 17.

INSTRUCTIONS FOR SECTION 1 - ACCIDENT CLASSIFICATION

(Mark All Boxes That Are Applicable)

a. GOVERNMENT. Mark "CIVILIAN" box if accident involved government civilian employee; mark "MILITARY" box if accident involved U.S. military personnel.

(1) INJURY/ILLNESS/FATALITY - Mark if accident resulted in any government civilian employee injury, illness, or fatality that requires the submission of OWCP Forms CA-1 *(injury)*, CA-2 *(illness)* or CA-6 *(fatality)* to OWCP; mark if accident resulted in military personnel lost-time or fatal injury or illness.

(2) PROPERTY DAMAGE - Mark the appropriate box if accident resulted in any damage of $1000 or more to government property *(including motor vehicles)*.

(3) VEHICLE INVOLVED - Mark if accident involved a motor vehicle, regardless of whether "INJURY/ILLNESS/FATALITY" or "PROPERTY DAMAGE" are marked.

(4) DIVING ACTIVITY - Mark if the accident involved an in-house USACE diving activity.

b. CONTRACTOR.

(1) INJURY/ILLNESS/FATALITY - Mark if accident resulted in any contractor lost-time injury/illness or fatality.

(2) PROPERTY DAMAGE - Mark the appropriate box if accident resulted in any damage of $1000 or more to contractor property *(including motor vehicles).*

(3) VEHICLE INVOLVED - Mark if accident involved a motor vehicle, regardless of whether "INJURY/ILLNESS/FATALITY" or "PROPERTY DAMAGE" are marked.

(4) DIVING ACTIVITY - Mark if the accident involved a USACE Contractor diving activity.

c. PUBLIC.

(1) INJURY/ILLNESS/FATALITY - Mark if accident resulted in public fatality or permanent total disability. *(The "OTHER" box will be marked when requested by the FOA to report an unusual non-fatal public accident that could result in claims against the government or as otherwise directed by the FOA Commander)*.

(2) VOID SPACE - Make no entry.

(3) VEHICLE INVOLVED - Mark if accident resulted in a fatality to a member of the public and involved a motor vehicle, regardless of whether "INJURY/ILLNESS/FATALITY" is marked.

(4) VOID SPACE - Make no entry.

INSTRUCTIONS FOR SECTION 2 - PERSONAL DATA

a. NAME - *(MANDATORY FOR GOVERNMENT ACCIDENTS. OPTIONAL AT THE DISCRETION OF THE FOA COMMANDER FOR CONTRACTOR AND PUBLIC ACCIDENTS)*. Enter last name, first name, middle initial of person involved.

b. AGE - Enter age.

c. SEX - Mark appropriate box.

d. SOCIAL SECURITY NUMBER - *(FOR GOVERNMENT PERSONNEL ONLY*) Enter the social security number *(or other personal identification number if no social security number issued).*

e. GRADE - *(FOR GOVERNMENT PERSONNEL ONLY)* Enter pay grade. Example: 0-6; E-7; WG-8; WS-12; GS-11; etc.

f. JOB SERIES/TITLE - For government civilian employees enter the pay plan, full series number, and job title, e.g., GS-O810/Civil Engineer. For military personnel enter the primary military occupational specialty *(PMOS)*, e.g., 15A30 or 11G50. For contractor employees enter the job title assigned to the injured person, e.g., carpenter, laborer, surveyor, etc.

g. DUTY STATUS - Mark the appropriate box.

(1) ON DUTY - Person was at duty station during duty hours or person was away from duty station during duty hours but on official business at time of the accident.

(2) TDY - Person was on official business, away from the duty station and with travel orders at time of accident. Line-of-duty investigation required.

(3) OFF DUTY - Person was not on official business at time of accident.

h. EMPLOYMENT STATUS - *(FOR GOVERNMENT PERSONNEL ONLY)* Mark the most appropriate box. If "OTHER" is marked, specify the employment status of the person.

INSTRUCTION FOR SECTION 3 - GENERAL INFORMATION

a. DATE OF ACCIDENT - Enter the month, day, and year of accident.

b. TIME OF ACCIDENT - Enter the local time of accident in military time. Example: 1430 hrs *(not 2:30 p.m.)*.

c. EXACT LOCATION OF ACCIDENT - Enter facts needed to locate the accident scene, *(installation/project name, building number, street, direction and distance from closest landmark, etc.)*.

d. CONTRACTOR NAME

(1) PRIME - Enter the exact name *(title of firm)* of the prime contractor.

(2) SUBCONTRACTOR - Enter the name of any subcontractor involved in the accident.

e. CONTRACT NUMBER - Mark the appropriate box to identify if contract is civil works, military, or other: if "OTHER" is marked, specify contract appropriation on line provided. Enter complete contract number of prime contract, e.g., DACW 09-85-C-0100.

f. TYPE OF CONTRACT - Mark appropriate box. A/E means architect/engineer. If "OTHER" is marked, specify type of contract on line provided.

g. HAZARDOUS/TOXIC WASTE ACTIVITY *(HTW)* - Mark the box to identify the HTW activity being performed at the time of the accident. For Superfund, DERP, and Installation Restoration Program *(IRP)* HTW activities include accidents that occurred during inventory, predesign, design, and construction. For the purpose of accident reporting, DERP Formerly Used DoD Site *(FUDS)* activities and IRP activities will be treated separately. For Civil Works O&M HTW activities mark the "OTHER" box.

INSTRUCTIONS FOR SECTION 4 - CONSTRUCTION ACTIVITIES

a. CONSTRUCTION ACTIVITY - Select the most appropriate construction activity being performed at time of accident from the list below. Enter the activity name and place the corresponding code number identified in the box.

CONSTRUCTION ACTIVITY LIST

1. MOBILIZATION
2. SITE PREPARATION
3. EXCAVATION/TRENCHING
4. GRADING (EARTHWORK)
5. PIPING/UTILITIES
6. FOUNDATION
7. FORMING
8. CONCRETE PLACEMENT
9. STEEL ERECTION
10. ROOFING
11. FRAMING
12. MASONRY
13. CARPENTRY
14. ELECTRICAL
15. SCAFFOLDING/ACCESS
16. MECHANICAL
17. PAINTING
18. EOUIPMENT/MAINTENANCE
19. TUNNELING
20. WAREHOUSING/STORAGE
21. PAVING
22. FENCING
23. SIGNING
24. LANDSCAPING/IRRIGATION
25. INSULATION
26. DEMOLITION

b. TYPE OF CONSTRUCTION EQUIPMENT - Select the equipment involved in the accident from the list below. Enter the name and place the corresponding code number identified in the box. If equipment is not included below, use code 24, "OTHER", and write in specific type of equipment.

CONSTRUCTION EQUIPMENT

1. GRADER
2. DRAGLINE
3. CRANE *(ON VESSEL/BARGE)*
4. CRANE *(TRACKED)*
5. CRANE *(RUBBER TIRE)*
6. CRANE *(VEHICLE MOUNTED)*
7. CRANE *(TOWER)*
8. SHOVEL
9. SCRAPER
10. PUMP TRUCK *(CONCRETE)*
11. TRUCK *(CONCRETE/TRANSIT MIXER)*
12. DUMP TRUCK *(HIGHWAY)*
13. DUMP TRUCK *(OFF HIGHWAY)*
14. TRUCK *(OTHER)*
15. FORKLIFT
16. BACKHOE
17. FRONT-END LOADER
18. PILE DRIVER
19. TRACTOR *(UTILITY)*
20. MANLIFT
21. DOZER
22. DRILL RIG
23. COMPACTOR/VIBRATORY ROLLER
24. OTHER

INSTRUCTIONS FOR SECTION 5 - INJURY/ILLNESS INFORMATION

a. SEVERITY OF INJURY/ILLNESS - Reference paragraph 2-10 of USACE Supplement 1 to AR 385-40 and enter code and description from list below.

NOI	NO INJURY
FAT	FATALITY
PTL	PERMANENT TOTAL DISABILITY
PPR	PERMANENT PARTIAL DISABILITY
LWD	LOST WORKDAY CASE INVOLVING DAYS AWAY FROM WORK
NLW	RECORDABLE CASE WITHOUT LOST WORKDAYS
RFA	RECORDABLE FIRST AID CASE
NRI	NON-RECORDABLE INJURY

b. ESTIMATED DAYS LOST - Enter the estimated number of workdays the person will lose from work.

c. ESTIMATED DAYS HOSPITALIZED - Enter the estimated number of workdays the person will be hospitalized.

d. ESTIMATED DAYS RESTRICTED DUTY - Enter the estimated number of workdays the person, as a result of the accident, will not be able to perform all of their regular duties.

e. BODY PART AFFECTED - Select the most appropriate primary and when applicable, secondary body part affected from the list below. Enter body part name on line and place the corresponding code letters identifying that body part in the box.

GENERAL BODY AREA	CODE	BODY PART NAME
ARM/WRIST	AB	ARM AND WRIST
	AS	ARM OR WRIST
TRUNK, EXTERNAL MUSCULATURE	B1	SINGLE BREAST
	B2	BOTH BREASTS
	B3	SINGLE TESTICLE
	B4	BOTH TESTICLES
	BA	ABDOMEN
	BC	CHEST
	BL	LOWER BACK
	BP	PENIS
	BS	SIDE
	BU	UPPER BACK
	BW	WAIST
	BZ	TRUNK OTHER
HEAD, INTERNAL	C1	SINGLE EAR INTERNAL
	C2	BOTH EARS INTERNAL
	C3	SINGLE EYE INTERNAL
	C4	BOTH EYES INTERNAL
	CB	BRAIN
	CC	CRANIAL BONES
	CD	TEETH
	CJ	JAW
	CL	THROAT, LARYNX
	CM	MOUTH
	CN	NOSE
	CR	THROAT, OTHER
	CT	TONGUE
	CZ	HEAD OTHER INTERNAL
ELBOW	EB	BOTH ELBOWS
	ES	SINGLE ELBOW
FINGER	F1	FIRST FINGER
	F2	BOTH FIRST FINGERS
	F3	SECOND FINGER
	F4	BOTH SECOND FINGERS
	F5	THIRD FINGER
	F6	BOTH THIRD FINGERS
	F7	FOURTH FINGER
	F8	BOTH FOURTH FINGERS
TOE	G1	GREAT TOE
	G2	BOTH GREAT TOES
	G3	TOE OTHER
	G4	TOES OTHER
HEAD, EXTERNAL	H1	EYE EXTERNAL
	H2	BOTH EYES EXTERNAL
	H3	EAR EXTERNAL
	H4	BOTH EARS EXTERNAL
	HC	CHIN
	HF	FACE
	HK	NECK/THROAT
	HM	MOUTH/LIPS
	HN	NOSE
	HS	SCALP
KNEE	KB	BOTH KNEES
	KS	KNEE
LEG, HIP, ANKLE, BUTTOCKS	LB	BOTH LEGS/HIPS/ ANKLES/
BUTTOCK	LS	SINGLE LEG/HIP/ ANKLE/BUTTOCK
HAND	MB	BOTH HANDS
	MS	SINGLE HAND
FOOT	PB	BOTH FEET
	PS	SINGLE FOOT
TRUNK, BONES	R1	SINGLE COLLAR BONE
	R2	BOTH COLLAR BONES
	R3	SHOULDER BLADE
	R4	BOTH SHOULDER BLADES
	RB	RIB
	RS	STERNUM *(BREAST BONE)*
	RV	VERTEBRAE *(SPINE; DISC)*
	RZ	TRUNK BONES OTHER
SHOULDER	SB	BOTH SHOULDERS
	SS	SINGLE SHOULDER
THUMB	TB	BOTH THUMBS
	TS	SINGLE THUMB
TRUNK, INTERNAL ORGANS	V1	LUNG, SINGLE
	V2	LUNGS, BOTH
	V3	KIDNEY, SINGLE
	V4	KIDNEYS, BOTH
	VH	HEART
	VL	LIVER
	VR	REPRODUCTIVE ORGANS
	VS	STOMACH
	VV	INTESTINES
	VZ	TRUNK, INTERNAL; OTHER

f. NATURE OF INJURY/ILLNESS - Select the most appropriate nature of injury/illness from the list below. This nature of injury/illness shall correspond to the primary body part selected in 5e, above. Enter the nature of injury/illness name on the line and place the corresponding CODE letters in the box provided.
* The injury or condition selected below must be caused by a specific incident or event which occurred during a single work day or shift.

GENERAL NATURE CATEGORY	CODE	NATURE OF INJURY NAME
*TRAUMATIC INJURY OR DISABILITY	TA	AMPUTATION
	TB	BACK STRAIN
	TC	CONTUSION; BRUISE; ABRASION
	TD	DISLOCATION
	TF	FRACTURE
	TH	HERNIA
	TK	CONCUSSION
	TL	LACERATION, CUT
	TP	PUNCTURE
	TS	STRAIN, MULTIPLE
	TU	BURN, SCALD, SUNBURN
	TI	TRAUMATIC SKIN DISEASES/ CONDITIONS INCLUDING DERMATITIS
	TR	TRAUMATIC RESPIRATORY DISEASE
	TQ	TRAUMATIC FOOD POISONING
	TW	TRAUMATIC TUBERCULOSIS
	TX	TRAUMATIC VIROLOGICAL/INFECTIVE/ PARASITIC DISEASE
	T1	TRAUMATIC CEREBRAL VASCULAR CONDITION/STROKE
	T2	TRAUMATIC HEARING LOSS
	T3	TRAUMATIC HEART CONDITION
	T4	TRAUMATIC MENTAL DISORDER, STRESS; NERVOUS CONDITION
	T8	TRAUMATIC INJURY - OTHER *(EXCEPT DISEASE, ILLNESS)*

** A nontraumatic physiological harm or loss of capacity produced by systemic infection; continued or repeated stress or strain; exposure to toxins, poisons, fumes, etc.; or other continued and repeated exposures to conditions of the work environment over a long period of time. For practical purposes, an occupational illness/disease or disability is any reported condition which does not meet the definition of traumatic injury or disability as described above.

GENERAL NATURE CATEGORY	CODE	NATURE OF INJURY NAME			
**NON-TRAUMATIC ILLNESS/DISEASE OR DISABILITY					
RESPIRATORY DISEASE	RA	ASBESTOSIS		DD	ENDEMIC DISEASE *(OTHER THAN CODE TYPES R&S)*
	RB	BRONCHITIS			
	RE	EMPHYSEMA		DE	EFFECT OF ENVIRONMENTAL
	RP	PNEUMOCONIOSIS	CONDITION		
	RS	SILICOSIS		DH	HEARING LOSS
	R9	RESPIRATORY DISEASE, OTHER		DK	HEART CONDITION
VIROLOGICAL, INFECTIVE & PARASITIC DISEASES				DM	MENTAL DISORDER, EMOTIONAL STRESS, NERVOUS CONDITION
	VB	BRUCELLOSIS		DR	RADIATION
	VC	COCCIDIOMYCOSIS		DS	STRAIN, MULTIPLE
	VF	FOOD POISONING		DU	ULCER
	VH	HEPATITIS		DV	OTHER VASCULAR CONDITIONS
	VM	MALARIA		D9	DISABILITY, OTHER
	VS	STAPHYLOCOCCUS			
	VT	TUBERCULOSIS	SKIN DISEASE OR		
	V9	VIROLOGICAL/INFECTIVE/ PARASITIC - OTHER	CONDITION	SB	BIOLOGICAL
DISABILITY, OCCUPATIONAL	DA	ARTHRITIS, BURSITIS		SC	CHEMICAL
	DB	BACK STRAIN, BACK SPRAIN		S9	DERMATITIS, UNCLASSIFIED
	DC	CEREBRAL VASCULAR CONDITION; STROKE			

g. TYPE AND SOURCE OF INJURY/ILLNESS *(CAUSE)* - Type and Source Codes are used to describe what caused the incident. The Type Code stands for an ACTION and the Source Code for an OBJECT or SUBSTANCE. Together, they form a brief description of how the incident occurred. Where there are two different sources, code the initiating source of the incident *(see example 1, below)*. Examples:

(1) An employee tripped on carpet and struck his head on a desk. TYPE: 210 *(fell on same level)* SOURCE: 0110 *(walking/working surface*).

NOTE: This example would NOT be coded 120 *(struck against)* and 0140 *(furniture)*.

(2) A Park Ranger contracted dermatitis from contact with poison ivy/oak.

TYPE: 510 *(contact)* SOURCE: 0920 *(plant)*

(3) A lock and dam mechanic punctured his finger with a metal sliver while grinding a turbine blade.

TYPE: 410 *(punctured by)* SOURCE: 0830 *(metal)*

(4) An employee was driving a government vehicle when it was struck by another vehicle.

TYPE: 800 *(traveling in)* SOURCE: 0421 *(government-owned vehicle, as driver)*

NOTE: The Type Code 800, "Traveling In" is different from the other type codes in that its function is not to identify factors contributing to the injury or fatality, but rather to collect data on the type of vehicle the employee was operating or traveling in at the time of the incident.

Select the most appropriate TYPE and SOURCE identifier from the list below and enter the name on the line and the corresponding code in the appropriate box.

CODE	TYPE OF INJURY NAME		
			EXERTED
		0610	LIFTED, STRAINED BY *(SINGLE ACTION)*
	STRUCK	0620	STRESSED BY *(REPEATED ACTION)*
0110	STRUCK BY		EXPOSED
0111	STRUCK BY FALLING OBJECT	0710	INHALED
0120	STRUCK AGAINST	0720	INGESTED
	FELL, SLIPPED, TRIPPED	0730	ABSORBED
0210	FELL ON SAME LEVEL	0740	EXPOSED TO
0220	FELL ON DIFFERENT LEVEL	0800	TRAVELING IN
0230	SLIPPED, TRIPPED *(NO FALL)*		
	CAUGHT	**CODE**	**SOURCE OF INJURY NAME**
0310	CAUGHT ON		
0320	CAUGHT IN	0100	BUILDING OR WORKING AREA
0330	CAUGHT BETWEEN	0110	WALKING/WORKING SURFACE *(FLOOR, STREET, SIDEWALKS, ETC.)*
	PUNCTURED, LACERATED		
0410	PUNCTURED BY	0120	STAIRS, STEPS
0420	CUT BY	0130	LADDER
0430	STUNG BY	0140	FURNITURE, FURNISHINGS, OFFICE EQUIPMENT
0440	BITTEN BY	0150	BOILER, PRESSURE VESSEL
	CONTACTED	0160	EQUIPMENT LAYOUT *(ERGONOMIC)*
0510	CONTACTED WITH *(INJURED PERSON MOVING)*	0170	WINDOWS, DOORS
0520	CONTACTED BY *(OBJECT WAS MOVING)*	0180	ELECTRICITY

0200	ENVIRONMENTAL CONDITION	0631	CARBON MONOXIDE
0210	TEMPERATURE EXTREME *(INDOOR)*	0640	MIST, STEAM, VAPOR, FUME
0220	WEATHER *(ICE, RAIN, HEAT, ETC.)*	0641	WELDING FUMES
0230	FIRE, FLAME, SMOKE *(NOT TOBACCO)*	0650	PARTICLES *(UNIDENTIFIED)*
0240	NOISE	0700	CHEMICAL, PLASTIC, ETC.
0250	RADIATION	0711	DRY CHEMICAL - CORROSIVE
0260	LIGHT	0712	DRY CHEMICAL - TOXIC
0270	VENTILATION	0713	DRY CHEMICAL - EXPLOSIVE
0271	TOBACCO SMOKE	0714	DRY CHEMICAL FLAMMABLE
0280	STRESS *(EMOTIONAL)*	0721	LIQUID CHEMICAL - CORROSIVE
0290	CONFINED SPACE	0722	LIQUID CHEMICAL - TOXIC
0300	MACHINE OR TOOL	0723	LIQUID CHEMICAL - EXPLOSIVE
0310	HAND TOOL *(POWERED; SAW, GRINDER, ETC.)*	0724	LIQUID CHEMICAL - FLAMMABLE
0320	HAND TOOL *(NONPOWERED)*	0730	PLASTIC
0330	MECHANICAL POWER TRANSMISSION APPARATUS	0740	WATER
0340	GUARD, SHIELD *(FIXED, MOVEABLE, INTERLOCK)*	0750	MEDICINE
0350	VIDEO DISPLAY TERMINAL	0800	INAMINATE OBJECT
0360	PUMP, COMPRESSOR, AIR PRESSURE TOOL	0810	BOX, BARREL, ETC.
0370	HEATING EQUIPMENT	0820	PAPER
0380	WELDING EQUIPMENT	0830	METAL ITEM, MINERAL
0400	VEHICLE	0831	NEEDLE
0411	AS DRIVER OF PRIVATELY OWNED/RENTAL VEHICLE	0840	GLASS
0412	AS PASSENGER OF PRIVATELY OWNED/RENTAL VEHICLE	0850	SCRAP, TRASH
0421	DRIVER OF GOVERNMENT VEHICLE	0860	WOOD
0422	PASSENGER OF GOVERNMENT VEHICLE	0870	FOOD
0430	COMMON CARRIER *(AIRLINE, BUS, ETC.)*	0880	CLOTHING, APPAREL, SHOES
0440	AIRCRAFT *(NOT COMMERCIAL)*	0900	ANIMATE OBJECT
0450	BOAT, SHIP, BARGE	0911	DOG
0500	MATERIAL HANDLING EQUIPMENT	0912	OTHER ANIMAL
0510	EARTHMOVER *(TRACTOR, BACKHOE, ETC.)*	0920	PLANT
0520	CONVEYOR *(FOR MATERIAL AND EQUIPMENT)*	0930	INSECT
0530	ELEVATOR, ESCALATOR, PERSONNEL HOIST	0940	HUMAN *(VIOLENCE)*
0540	HOIST, SLING CHAIN, JACK	0950	HUMAN *(COMMUNICABLE DISEASE)*
0550	CRANE	0960	BACTERIA, VIRUS *(NOT HUMAN CONTACT)*
0551	FORKLIFT	1000	PERSONAL PROTECTIVE EQUIPMENT
0560	HANDTRUCK, DOLLY	1010	PROTECTIVE CLOTHING, SHOES, GLASSES, GOGGLES
0600	DUST, VAPOR, ETC.		
0610	DUST *(SILICA, COAL, ETC.)*	1020	RESPIRATOR, MASK
0620	FIBERS	1021	DIVING EQUIPMENT
0621	ASBESTOS	1030	SAFETY BELT, HARNESS
0630	GASES	1040	PARACHUTE

INSTRUCTIONS FOR SECTION 6 - PUBLIC FATALITY

a. ACTIVITY AT TIME OF ACCIDENT - Select the activity being performed at the time of the accident from the list below. Enter the activity name on the line and the corresponding number in the box. If the activity performed is not identified on the list, select from the most appropriate primary activity area *(water related, non-water related or other activity)*, the code number for "Other", and write in the activity being performed at the time of the accident.

WATER RELATED RECREATION

1. Sailing
2. Boating-powered
3. Boating-unpowered
4. Water skiing
5. Fishing from boat
6. Fishing from bank dock or pier
7. Fishing while wading
8. Swimming/supervised area
9. Swimming/designated area
10. Swimming/other area
11. Underwater activities *(skin diving, scuba, etc.)*
12. Wading
13. Attempted rescue
14. Hunting from boat
15. Other

NON-WATER RELATED RECREATION

16. Hiking and walking
17. Climbing *(general)*
18. Camping/picnicking authorized area
19. Camping/picnicking unauthorized area
20. Guided tours
21. Hunting
22. Playground equipment
23. Sports/summer *(baseball, football, etc.)*
24. Sports/winter *(skiing, sledding, snowmobiling etc.)*
25. Cycling *(bicycle, motorcycle, scooter)*
26. Gliding
27. Parachuting
28. Other non-water related

OTHER ACTIVITIES

29. Unlawful acts *(fights, riots, vandalism, etc.)*
30. Food preparation/serving
31. Food consumption
32. Housekeeping
33. Sleeping
34. Pedestrian struck by vehicle
35. Pedestrian other acts
36. Suicide
37. "Other" activities

b. PERSONAL FLOTATION DEVICE USED - If fatality was water-related was the victim wearing a person flotation device? Mark the appropriate box.

INSTRUCTIONS FOR SECTION 7 - MOTOR VEHICLE ACCIDENT

a. TYPE OF VEHICLE - Mark appropriate box for each vehicle involved. If more than one vehicle of the same type is involved, mark both halves of the appropriate box. USACE vehicle(s) involved shall be marked in left half of appropriate box.

b. TYPE OF COLLISION - Mark appropriate box.

c. SEAT BELT - Mark appropriate box.

INSTRUCTIONS FOR SECTION 8 - PROPERTY/MATERIAL INVOLVED

a. NAME OF ITEM - Describe all property involved in accident. Property/material involved means material which is damaged or whose use or misuse contributed to the accident. Include the name, type, model; also include the National Stock Number *(NSN)* whenever applicable.

b. OWNERSHIP - Enter ownership for each item listed. *(Enter one of the following: USACE; OTHER GOVERNMENT; CONTRACTOR; PRIVATE)*

c. $ AMOUNT OF DAMAGE - Enter the total estimated dollar amount of damage *(parts and labor)*, if any.

INSTRUCTIONS FOR SECTION 9 - VESSEL/FLOATING PLANT ACCIDENT

a. TYPE OF VESSEL/FLOATING PLANT - Select the most appropriate vessel/floating plant from list below. Enter name and place corresponding number in box. If item is not listed below, enter item number for "OTHER" and write in specific type of vessel floating plant.

VESSEL/FLOATING PLANTS

1. ROW BOAT
2. SAIL BOAT
3. MOTOR BOAT
4. BARGE
5. DREDGE/HOPPER
6. DREDGE/SIDE CASTING
7. DREDGE/DIPPER
8. DREDGE/CLAMSHELL, BUCKET
9. DREDGE/PIPE LINE
10. DREDGE/DUST PAN
11. TUG BOAT
12. OTHER

b. COLLISION/MISHAP - Select from the list below the object*(s)* that contributed to the accident or were damaged in the accident.

COLLISION/MISHAP

1. COLLISION W/OTHER VESSEL
2. UPPER GUIDE WALL
3. UPPER LOCK GATES
4. LOCK WALL
5. LOWER LOCK GATES
6. LOWER GUIDE WALL
7. HAULAGE UNIT
8. BREAKING TOW
9. TOW BREAKING UP
10. SWEPT DOWN 0N DAM
11. BUOY/DOLPHIN/CELL
12. WHARF OR DOCK
13. OTHER

INSTRUCTIONS FOR SECTION 10 - ACCIDENT DESCRIPTION

DESCRIBE ACCIDENT - Fully describe the accident. Give the sequence of events that describe what happened leading up to and including the accident. Fully identify personnel and equipment involved and their role*(s)* in the accident. Ensure that relationships between personnel and equipment are clearly specified. Continue on blank sheets if necessary and attach to this report.

INSTRUCTIONS FOR SECTION 11 - CAUSAL FACTORS

a. Review thoroughly. Answer each question by marking the appropriate block. If any answer is yes, explain in item 13 below. Consider, as a minimum, the following:

(1) DESIGN - Did inadequacies associated with the building or work site play a role? Would an improved design or layout of the equipment or facilities reduce the likelihood of similar accidents? Were the tools or other equipment designed and intended for the task at hand?

(2) INSPECTION/MAINTENANCE - Did inadequately or improperly maintained equipment, tools, workplace, etc. create or worsen any hazards that contributed to the accident? Would better equipment, facility, work site or work activity inspections have helped avoid the accident?

(3) PERSON'S PHYSICAL CONDITION - Do you feel that the accident would probably not have occurred if the employee was in "good" physical condition? If the person involved in the accident had been in better physical condition, would the accident have been less severe or avoided altogether? Was over exertion a factor?

(4) OPERATING PROCEDURES - Did a lack of or inadequacy within established operating procedures contribute to the accident? Did any aspect of the procedures introduce any hazard to, or increase the risk associated with the work process? Would establishment or improvement of operating procedures reduce the likelihood of similar accidents?

(5) JOB PRACTICES - Were any of the provisions of the Safety and Health Requirements Manual *(EM 385-1-1)* violated? Was the task being accomplished in a manner which was not in compliance with an established job hazard analysis or activity hazard analysis? Did any established job practice *(including EM 385-1-1)* fail to adequately address the task or work process? Would better job practices improve the safety of the task?

(6) HUMAN FACTORS - Was the person under undue stress *(either internal or external to the job)*? Did the task tend toward overloading the capabilities of the person; i.e., did the job require tracking and reacting to many external inputs such as displays, alarms, or signals? Did the arrangement of the workplace tend to interfere with efficient task performance? Did the task require reach, strength, endurance, agility, etc., at or beyond the capabilities of the employee? Was the work environment ill-adapted to the person? Did the person need more training, experience, or practice in doing the task? Was the person inadequately rested to perform safely?

(7) ENVIRONMENTAL FACTORS - Did any factors such as moisture, humidity, rain, snow, sleet, hail, ice, fog, cold, heat, sun, temperature changes, wind, tides, floods, currents, dust, mud, glare, pressure changes, lightning, etc., play a part in the accident?

(8) CHEMICAL AND PHYSICAL AGENT FACTORS - Did exposure to chemical agents *(either single shift exposure or long-term exposure)* such as dusts, fibers *(asbestos, etc.)*, silica, gases *(carbon monoxide, chlorine, etc.,)*, mists, steam, vapors, fumes, smoke, other particulates, liquid or dry chemicals that are corrosive, toxic, explosive or flammable, by products of combustion or physical agents such as noise, ionizing radiation, non-ionizing radiation *(UV radiation created during welding, etc.)* contribute to the accident/incident?

(9**)** OFFICE FACTORS **-** Did the fact that the accident occurred in an office setting or to an office worker have a bearing on its cause? For example, office workers tend to have less experience and training in performing tasks such as lifting office furniture. Did physical hazards within the office environment contribute to the hazard?

(10) SUPPORT FACTORS - Was the person using an improper tool for the job? Was inadequate time available or utilized to safely accomplish the task? Were less than adequate personnel resources *(in terms of employee skills, number of workers, and adequate supervision)* available to get the job done properly? Was funding available, utilized, and adequate to provide proper tools, equipment, personnel, site preparation, etc.?

(11) PERSONAL PROTECTIVE EQUIPMENT - Did the person fail to use appropriate personal protective equipment *(gloves, eye protection, hard-toed shoes, respirator, etc.)* for the task or environment? Did protective equipment provided or worn fail to provide adequate protection from the hazard*(s)*? Did lack of or inadequate maintenance of protective gear contribute to the accident?

(12) DRUGS/ALCOHOL - Is there any reason to believe the person's mental or physical capabilities, judgment, etc., were impaired or altered by the use of drugs or alcohol? Consider the effects of prescription medicine and over the counter medications as well as illicit drug use. Consider the effect of drug or alcohol induced "hangovers".

b. WRITTEN JOB/ACTIVITY HAZARD ANALYSIS - Was a written Job/Activity Hazard Analysis completed for the task being performed at the time of the accident? Mark the appropriate box. If one was performed, attach a copy of the analysis to the report.

INSTRUCTIONS FOR SECTION 12 - TRAINING

a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK? - For the purpose of this section "trained" means the person has been provided the necessary information *(either formal and/or on-the-job (OJT) training)* to competently perform the activity/task in a safe and healthful manner.

b. TYPE OF TRAINING - Mark the appropriate box that best indicates the type of training; *(classroom or on-the-job)* that the injured person received, before the accident happened.

c. DATE OF MOST RECENT TRAINING - Enter YYYYMMDD of the last formal training completed that covered the activity task being performed at the time of the accident.

INSTRUCTIONS FOR SECTION 13 - CAUSES

a. DIRECT CAUSES - The direct cause is that single factor, which most directly lead to the accident. See examples below.

b. INDIRECT CAUSES - **I**ndirect causes are those factors which contributed to but did not directly initiate the occurrence of the accident.

Examples for section 13:

a. Employee was dismantling scaffold and fell 12 feet from unguarded opening.

Direct cause: failure to provide fall protection at elevation. Indirect causes: failure to enforce USACE safety requirements; improper training/motivation of employee *(possibility that employee was not knowledgeable of USACE fall protection requirements or was lax in his attitude towards safety)*; failure to ensure provision of positive fall protection whenever elevated; failure to address fall protection during scaffold dismantling in phase hazard analysis.

b. Private citizen had stopped his vehicle at intersection for red light when vehicle was struck in rear by USACE vehicle. *(Note: USACE vehicle was in proper/safe working condition).*

Direct cause: failure of USACE driver to maintain control of and stop USACE vehicle within safe distance.

Indirect cause: failure of employee to pay attention to driving *(defensive driving).*

INSTRUCTIONS FOR SECTION 14 - ACTION TO ELIMINATE CAUSE*(s)*

DESCRIPTION - Fully describe all the actions taken, anticipated, and recommended to eliminate the cause(s) and prevent reoccurrence of similar accidents/ illnesses. Continue on blank sheets of paper if necessary to fully explain and attach to the completed report form.

INSTRUCTIONS FOR SECTION 15 - DATES FOR ACTION

a. **BEGIN DATE** - Enter the date YYYYMMDD when the corrective action(s) identified in section 14 will begin.

b. **COMPLETE DATE** - Enter the date YYYYMMDD when the corrective action(s) identified in section 14 will be completed.

c. **DATE SIGNED** - Enter YYYYMMDD that the report was signed by the responsible supervisor.

d.e.. **TITLE AND SIGNATURE -** Enter the title and signature of supervisor completing the accident report. For a GOVERNMENT employee accident/illness the immediate supervisor will complete and sign the report. For PUBLIC accidents the USACE Project Manager/Area Engineer responsible for the USACE property where the accident happened shall complete and sign the report. For CONTRACTOR accidents the Contractor's project manager shall complete and sign the report and provide to the USACE supervisor responsible for oversight of that contractor activity. This USACE supervisor shall also sign the report. Upon entering the information required in 15c., 15d., 15e., 15f. and 15g. below, the responsible USACE supervisor shall forward the report for management review as indicated in section 16.

f. **ORGANIZATION NAME** - For GOVERNMENT employee accidents enter the USACE organization name *(Division, Branch, Section, etc.)* of the injured employee. For PUBLIC accidents enter the USACE organization name for the person identified in block 15d. For CONTRACTOR accidents enter the USACE organization name for the USACE office responsible for providing contract administration oversight.

g. **OFFICE SYMBOL** - Enter the latest complete USACE Office Symbol for the USACE organization identified in block 15f.

INSTRUCTIONS FOR SECTION 16 - MANAGEMENT REVIEW (1st)

1ST REVIEW - Each USACE FOA shall determine who will provide 1st management review. The responsible USACE supervisor in section 15d. shall forward the completed report to the USACE office designated as the 1st Reviewer by the FOA. Upon receipt, the Chief of the Office shall review the completed report, mark the appropriate box, provide substantive comments, sign, date, and forward to the FOA Staff Chief *(2nd review)* for review and comment.

INSTRUCTIONS FOR SECTION 17 - MANAGEMENT REVIEW (2nd)

2ND REVIEW - The FOA Staff Chief *(i .e., FOA Chief of Construction, Operations, Engineering, Planning, etc.)* shall mark the appropriate box, review the completed report, provide substantive comments, sign, date, and return to the FOA Safety and Occupational Health Office.

INSTRUCTIONS FOR SECTION 18 - SAFETY AND OCCUPATIONAL HEALTH REVIEW

3RD REVIEW - The FOA Safety and Occupational Health Office shall review the completed report, mark the appropriate box, ensure that any inadequacies, discrepancies, etc. are rectified by the responsible supervisor and management reviewers, provide substantive comments, sign, date and forward to the FOA Commander for review, comment, and signature.

INSTRUCTION FOR SECTION 19 - COMMAND APPROVAL

4TH REVIEW - The FOA Commander shall *(to include the person designated Acting Commander in his absence)* review the completed report, comment if required, sign, date, and forward the report to the FOA Safety and Occupational Health Office. Signature authority shall not be delegated.

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CONTRACTOR ACCIDENT INITIAL NOTIFICATION

TO: Chief, Safety & Occupational Health Office Office: (501) 324-5616/5617/6939 Fax: (501) 324-5270 Cell: (501) 412-9257, Industrial Hygienist Cell: (501) 416-6808, Safety & Occupational Health Specialist	Chief, Safety & Occupational Health Office Office: (501) 324-5616 Cell: (501) 265-9403
NAME OF PERSON MAKING THE REPORT	PHONE NUMBER
DATE OF ACCIDENT	TIME
NAME OF EMPLOYEE	OCCUPATION
CONTRACT NUMBER	CONTRACT DESCRIPTION
CONTRACT LOCATION	ACCIDENT LOCATION

CLASSIFICATION OF ACCIDENT Personal Injury ☐ Vehicle ☐ Property ☐ Fatality ☐

DESCRIPTION OF INJURY/DAMAGE

DESCRIPTION OF ACCIDENT

ADDITIONAL REPORTS REQUIRED

- ☐ Initial Notification (e-mail DLL-CESWL-Accident Immediate Notification)
- ☐ Preliminary Accident Notification (PAN), (immediate following accident)
- ☐ Report of Serious Accident (ROSA), CLASS A & B accidents only
- ☐ ENG Form 3394, dated Mar 99 (fax copy to Safety Office within 48 hours; original routed thru Division Chief to Safety Office)
- ☐ Activity Hazard Analysis (AHA)
- ☐ Lessons Learned

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OSHA
Forms for Recording
Work-Related Injuries and Illnesses

U.S. Department of Labor
Occupational Safety and Health Administration

Dear Employer:

This booklet includes the forms needed for maintaining occupational injury and illness records for 2004. These new forms have changed in several important ways from the 2003 recordkeeping forms.

In the December 17, 2002 Federal Register (67 FR 77165-77170), OSHA announced its decision to add an occupational hearing loss column to OSHA's Form 300, Log of Work-Related Injuries and Illnesses. This forms package contains modified Forms 300 and 300A which incorporate the additional column M(5) Hearing Loss. Employers required to complete the injury and illness forms must begin to use these forms on January 1, 2004.

In response to public suggestions, OSHA also has made several changes to the forms package to make the recordkeeping materials clearer and easier to use:

- On Form 300, we've switched the positions of the day count columns. The days "away from work" column now comes before the days "on job transfer or restriction."
- We've clarified the formulas for calculating incidence rates.
- We've added new recording criteria for occupational hearing loss to the "Overview" section.
- On Form 300, we've made the column heading "Classify the Case" more prominent to make it clear that employers should mark only one selection among the four columns offered.

The Occupational Safety and Health Administration shares with you the goal of preventing injuries and illnesses in our nation's workplaces. Accurate injury and illness records will help us achieve that goal.

Occupational Safety and Health Administration
U.S. Department of Labor

What's Inside...

In this package, you'll find everything you need to complete OSHA's *Log* and the *Summary of Work-Related Injuries and Illnesses* for the next several years. On the following pages, you'll find:

- ***An Overview: Recording Work-Related Injuries and Illnesses —*** General instructions for filling out the forms in this package and definitions of terms you should use when you classify your cases as injuries or illnesses.

- ***How to Fill Out the Log —*** An example to guide you in filling out the *Log* properly.

- ***Log of Work-Related Injuries and Illnesses —*** Several pages of the *Log* (but you may make as many copies of the *Log* as you need.) Notice that the *Log* is separate from the *Summary*.

- ***Summary of Work-Related Injuries and Illnesses —*** Removable *Summary* pages for easy posting at the end of the year. Note that you post the *Summary* only, not the *Log*.

- ***Worksheet to Help You Fill Out the Summary —*** A worksheet for figuring the average number of employees who worked for your establishment and the total number of hours worked.

- ***OSHA's 301: Injury and Illness Incident Report —*** A copy of the OSHA 301 to provide details about the incident. You may make as many copies as you need or use an equivalent form.

Take a few minutes to review this package. If you have any questions, ***visit us online at www.osha. gov*** **or** ***call your local OSHA office.*** We'll be happy to help you.

An Overview: Recording Work-Related Injuries and Illnesses

The Occupational Safety and Health (OSH) Act of 1970 requires certain employers to prepare and maintain records of work-related injuries and illnesses. Use these definitions when you classify cases on the Log. OSHA's recordkeeping regulation (see 29 CFR Part 1904) provides more information about the definitions below.

The *Log of Work-Related Injuries and Illnesses* (Form 300) is used to classify work-related injuries and illnesses and to note the extent and severity of each case. When an incident occurs, use the *Log* to record specific details about what happened and how it happened. The *Summary* — a separate form (Form 300A) — shows the totals for the year in each category. At the end of the year, post the *Summary* in a visible location so that your employees are aware of the injuries and illnesses occurring in their workplace.

Employers must keep a *Log* for each establishment or site. If you have more than one establishment, you must keep a separate *Log* and *Summary* for each physical location that is expected to be in operation for one year or longer.

Note that your employees have the right to review your injury and illness records. For more information, see 29 Code of Federal Regulations Part 1904.35, *Employee Involvement.*

Cases listed on the *Log of Work-Related Injuries and Illnesses* are not necessarily eligible for workers' compensation or other insurance benefits. Listing a case on the *Log* does not mean that the employer or worker was at fault or that an OSHA standard was violated.

When is an injury or illness considered work-related?

An injury or illness is considered work-related if an event or exposure in the work environment caused or contributed to the condition or significantly aggravated a preexisting condition. Work-relatedness is presumed for injuries and illnesses resulting from events or exposures occurring in the workplace, unless an exception specifically applies. See 29 CFR Part 1904.5(b)(2) for the exceptions. The work environment includes the establishment and other locations where one or more employees are working or are present as a condition of their employment. See 29 CFR Part 1904.5(b)(1).

Which work-related injuries and illnesses should you record?

Record those work-related injuries and illnesses that result in:

- death,
- loss of consciousness,
- days away from work,
- restricted work activity or job transfer, or
- medical treatment beyond first aid.

You must also record work-related injuries and illnesses that are significant (as defined below) or meet any of the additional criteria listed below.

You must record any significant work-related injury or illness that is diagnosed by a physician or other licensed health care professional. You must record any work-related case involving cancer, chronic irreversible disease, a fractured or cracked bone, or a punctured eardrum. See 29 CFR 1904.7.

What are the additional criteria?

You must record the following conditions when they are work-related:

- any needlestick injury or cut from a sharp object that is contaminated with another person's blood or other potentially infectious material;
- any case requiring an employee to be medically removed under the requirements of an OSHA health standard;
- tuberculosis infection as evidenced by a positive skin test or diagnosis by a physician or other licensed health care professional after exposure to a known case of active tuberculosis.
- an employee's hearing test (audiogram) reveals 1) that the employee has experienced a Standard Threshold Shift (STS) in hearing in one or both ears (averaged at 2000, 3000, and 4000 Hz) and 2) the employee's total hearing level is 25 decibels (dB) or more above audiometric zero (also averaged at 2000, 3000, and 4000 Hz) in the same ear(s) as the STS.

What is medical treatment?

Medical treatment includes managing and caring for a patient for the purpose of combating disease or disorder. The following are not considered medical treatments and are NOT recordable:

- visits to a doctor or health care professional solely for observation or counseling;

What do you need to do?

1. Within 7 calendar days after you receive information about a case, decide if the case is recordable under the OSHA recordkeeping requirements.
2. Determine whether the incident is a new case or a recurrence of an existing one.
3. Establish whether the case was work-related.
4. If the case is recordable, decide which form you will fill out as the injury and illness incident report.

   You may use *OSHA's 301: Injury and Illness Incident Report* or an equivalent form. Some state workers compensation, insurance, or other reports may be acceptable substitutes, as long as they provide the same information as the OSHA 301.

How to work with the Log

1. Identify the employee involved unless it is a privacy concern case as described below.
2. Identify when and where the case occurred.
3. Describe the case, as specifically as you can.
4. Classify the seriousness of the case by recording the **most serious outcome** associated with the case, with column G (Death) being the most serious and column J (Other recordable cases) being the least serious.
5. Identify whether the case is an injury or illness. If the case is an injury, check the injury category. If the case is an illness, check the appropriate illness category.

U.S. Department of Labor
Occupational Safety and Health Administration

- diagnostic procedures, including administering prescription medications that are used solely for diagnostic purposes; and
- any procedure that can be labeled first aid. (*See below for more information about first aid.*)

What is first aid?

If the incident required only the following types of treatment, consider it first aid. Do NOT record the case if it involves only:

- using non-prescription medications at non-prescription strength;
- administering tetanus immunizations;
- cleaning, flushing, or soaking wounds on the skin surface;
- using wound coverings, such as bandages, BandAids™, gauze pads, etc., or using SteriStrips™ or butterfly bandages.
- using hot or cold therapy;
- using any totally non-rigid means of support, such as elastic bandages, wraps, non-rigid back belts, etc.;
- using temporary immobilization devices while transporting an accident victim (splints, slings, neck collars, or back boards).
- drilling a fingernail or toenail to relieve pressure, or draining fluids from blisters;
- using eye patches;
- using simple irrigation or a cotton swab to remove foreign bodies not embedded in or adhered to the eye;
- using irrigation, tweezers, cotton swab or other simple means to remove splinters or foreign material from areas other than the eye;
- using finger guards;
- using massages;
- drinking fluids to relieve heat stress

How do you decide if the case involved restricted work?

Restricted work activity occurs when, as the result of a work-related injury or illness, an employer or health care professional keeps, or recommends keeping, an employee from doing the routine functions of his or her job or from working the full workday that the employee would have been scheduled to work before the injury or illness occurred.

How do you count the number of days of restricted work activity or the number of days away from work?

Count the number of calendar days the employee was on restricted work activity or was away from work as a result of the recordable injury or illness. Do not count the day on which the injury or illness occurred in this number. Begin counting days from the day after the incident occurs. If a single injury or illness involved both days away from work and days of restricted work activity, enter the total number of days for each. You may stop counting days of restricted work activity or days away from work once the total of either or the combination of both reaches 180 days.

Under what circumstances should you NOT enter the employee's name on the OSHA Form 300?

You must consider the following types of injuries or illnesses to be privacy concern cases:

- an injury or illness to an intimate body part or to the reproductive system,
- an injury or illness resulting from a sexual assault,
- a mental illness,
- a case of HIV infection, hepatitis, or tuberculosis,
- a needlestick injury or cut from a sharp object that is contaminated with blood or other potentially infectious material (see 29 CFR Part 1904.8 for definition), and
- other illnesses, if the employee independently and voluntarily requests that his or her name not be entered on the log.

You must not enter the employee's name on the OSHA 300 *Log* for these cases. Instead, enter "privacy case" in the space normally used for the employee's name. You must keep a separate, confidential list of the case numbers and employee names for the establishment's privacy concern cases so that you can update the cases and provide information to the government if asked to do so.

If you have a reasonable basis to believe that information describing the privacy concern case may be personally identifiable even though the employee's name has been omitted, you may use discretion in describing the injury or illness on both the OSHA 300 and 301 forms. You must enter enough information to identify the cause of the incident and the general severity of the injury or illness, but you do not need to include details of an intimate or private nature.

What if the outcome changes after you record the case?

If the outcome or extent of an injury or illness changes after you have recorded the case, simply draw a line through the original entry or, if you wish, delete or white-out the original entry. Then write the new entry where it belongs. Remember, you need to record the most serious outcome for each case.

Classifying injuries

An injury is any wound or damage to the body resulting from an event in the work environment.

Examples: Cut, puncture, laceration, abrasion, fracture, bruise, contusion, chipped tooth, amputation, insect bite, electrocution, or a thermal, chemical, electrical, or radiation burn. Sprain and strain injuries to muscles, joints, and connective tissues are classified as injuries when they result from a slip, trip, fall or other similar accidents.

U.S. Department of Labor
Occupational Safety and Health Administration

Classifying illnesses

Skin diseases or disorders

Skin diseases or disorders are illnesses involving the worker's skin that are caused by work exposure to chemicals, plants, or other substances.

Examples: Contact dermatitis, eczema, or rash caused by primary irritants and sensitizers or poisonous plants; oil acne; friction blisters, chrome ulcers; inflammation of the skin.

Respiratory conditions

Respiratory conditions are illnesses associated with breathing hazardous biological agents, chemicals, dust, gases, vapors, or fumes at work.

Examples: Silicosis, asbestosis, pneumonitis, pharyngitis, rhinitis or acute congestion; farmer's lung, beryllium disease, tuberculosis, occupational asthma, reactive airways dysfunction syndrome (RADS), chronic obstructive pulmonary disease (COPD), hypersensitivity pneumonitis, toxic inhalation injury, such as metal fume fever, chronic obstructive bronchitis, and other pneumoconioses.

Poisoning

Poisoning includes disorders evidenced by abnormal concentrations of toxic substances in blood, other tissues, other bodily fluids, or the breath that are caused by the ingestion or absorption of toxic substances into the body.

Examples: Poisoning by lead, mercury, cadmium, arsenic, or other metals; poisoning by carbon monoxide, hydrogen sulfide, or other gases; poisoning by benzene, benzol, carbon tetrachloride, or other organic solvents; poisoning by insecticide sprays, such as parathion or lead arsenate; poisoning by other chemicals, such as formaldehyde.

Hearing Loss

Noise-induced hearing loss is defined for recordkeeping purposes as a change in hearing threshold relative to the baseline audiogram of an average of 10 dB or more in either ear at 2000, 3000 and 4000 hertz, and the employee's total hearing level is 25 decibels (dB) or more above audiometric zero (also averaged at 2000, 3000, and 4000 hertz) in the same ear(s).

All other illnesses

All other occupational illnesses.

Examples: Heatstroke, sunstroke, heat exhaustion, heat stress and other effects of environmental heat; freezing, frostbite, and other effects of exposure to low temperatures; decompression sickness; effects of ionizing radiation (isotopes, x-rays, radium); effects of nonionizing radiation (welding flash, ultra-violet rays, lasers); anthrax; bloodborne pathogenic diseases, such as AIDS, HIV, hepatitis B or hepatitis C; brucellosis; malignant or benign tumors; histoplasmosis; coccidioidomycosis.

When must you post the Summary?

You must post the *Summary* only — not the *Log* — by February 1 of the year following the year covered by the form and keep it posted until April 30 of that year.

How long must you keep the Log and Summary on file?

You must keep the *Log* and *Summary* for 5 years following the year to which they pertain.

Do you have to send these forms to OSHA at the end of the year?

No. You do not have to send the completed forms to OSHA unless specifically asked to do so.

How can we help you?

If you have a question about how to fill out the *Log*,

- ❑ ***visit us online at www.osha.gov*** or
- ❑ ***call your local OSHA office.***

Optional

Calculating Injury and Illness Incidence Rates

U.S. Department of Labor
Occupational Safety and Health Administration

What is an incidence rate?

An incidence rate is the number of recordable injuries and illnesses occurring among a given number of full-time workers (usually 100 full-time workers) over a given period of time (usually one year). To evaluate your firm's injury and illness experience over time or to compare your firm's experience with that of your industry as a whole, you need to compute your incidence rate. Because a specific number of workers and a specific period of time are involved, these rates can help you identify problems in your workplace and/or progress you may have made in preventing work-related injuries and illnesses.

How do you calculate an incidence rate?

You can compute an occupational injury and illness incidence rate for all recordable cases or for cases that involved days away from work for your firm quickly and easily. The formula requires that you follow instructions in paragraph (a) below for the total recordable cases or those in paragraph (b) for cases that involved days away from work, *and* for both rates the instructions in paragraph (c).

(a) *To find out the total number of recordable injuries and illnesses that occurred during the year,* count the number of line entries on your OSHA Form 300, or refer to the OSHA Form 300A and sum the entries for columns (G), (H), (I), and (J).

(b) *To find out the number of injuries and illnesses that involved days away from work,* count the number of line entries on your OSHA Form 300 that received a check mark in column (H), or refer to the entry for column (H) on the OSHA Form 300A.

(c) *The number of hours all employees actually worked during the year*. Refer to OSHA Form 300A and optional worksheet to calculate this number.

You can compute the incidence rate for all recordable cases of injuries and illnesses using the following formula:

Total number of injuries and illnesses x *200,000* ÷ *Number of hours worked by all employees = Total recordable case rate*

(The 200,000 figure in the formula represents the number of hours 100 employees working 40 hours per week, 50 weeks per year would work, and provides the standard base for calculating incidence rates.)

You can compute the incidence rate for recordable cases involving days away from work, days of restricted work activity or job transfer (DART) using the following formula:

(Number of entries in column H + Number of entries in column I) x *200,000* ÷ *Number of hours worked by all employees = DART incidence rate*

You can use the same formula to calculate incidence rates for other variables such as cases involving restricted work activity (column (I) on Form 300A), cases involving skin disorders (column (M-2) on Form 300A), etc. Just substitute the appropriate total for these cases, from Form 300A, into the formula in place of the total number of injuries and illnesses.

What can I compare my incidence rate to?

The Bureau of Labor Statistics (BLS) conducts a survey of occupational injuries and illnesses each year and publishes incidence rate data by various classifications (e.g., by industry, by employer size, etc.). You can obtain these published data at www.bls.gov/iif or by calling a BLS Regional Office.

Worksheet

Total number of injuries and illnesses		200,000	÷	Number of hours worked by all employees	=	Total recordable case rate
	x					

Number of entries in Column H + Column I		200,000	÷	Number of hours worked by all employees	=	DART incidence rate
	x					

How to Fill Out the Log

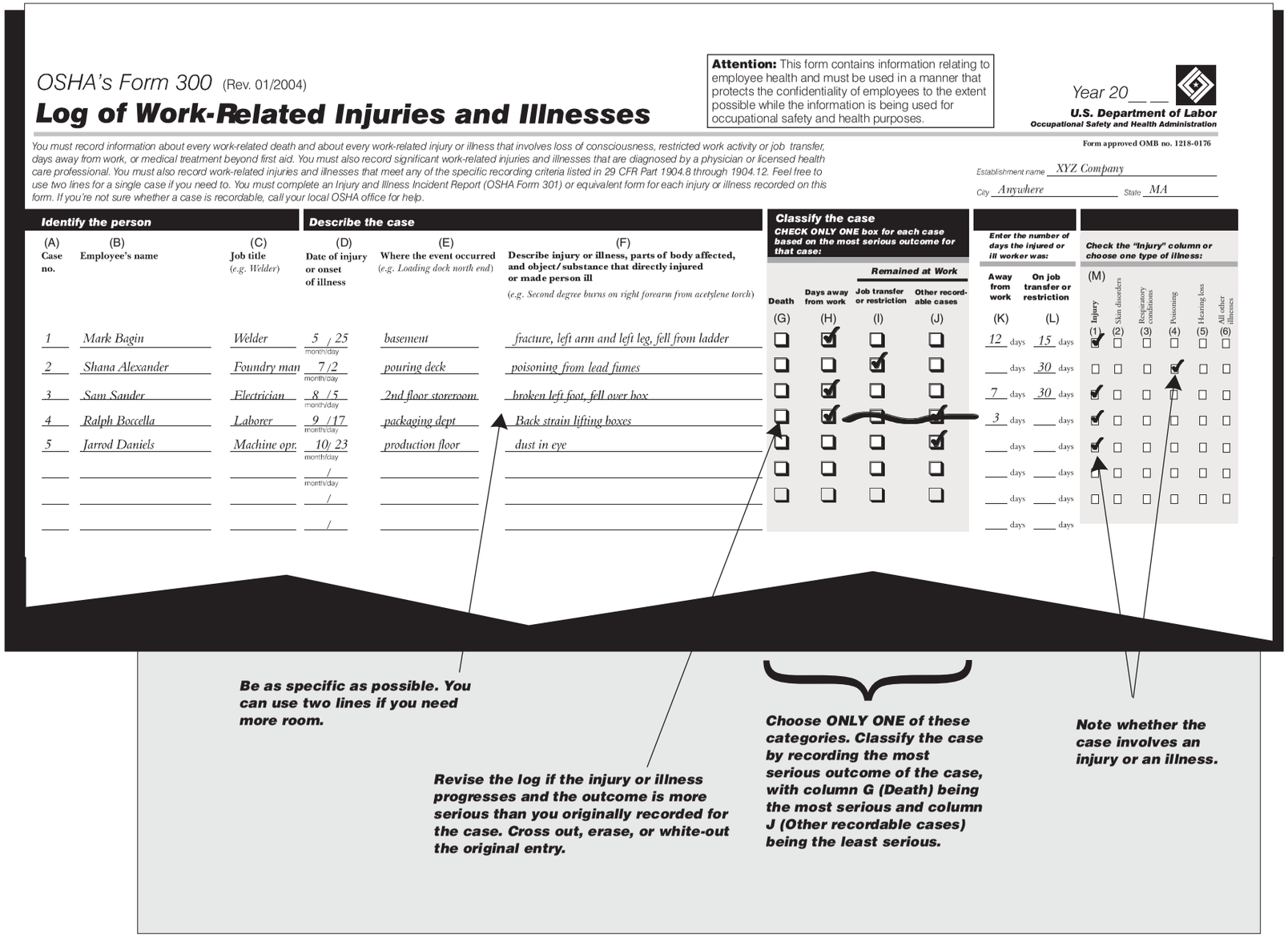
The *Log of Work-Related Injuries and Illnesses* is used to classify work-related injuries and illnesses and to note the extent and severity of each case. When an incident occurs, use the *Log* to record specific details about what happened and how it happened.

If your company has more than one establishment or site, you must keep separate records for each physical location that is expected to remain in operation for one year or longer.

We have given you several copies of the *Log* in this package. If you need more than we provided, you may photocopy and use as many as you need.

The *Summary* — a separate form — shows the work-related injury and illness totals for the year in each category. At the end of the year, count the number of incidents in each category and transfer the totals from the *Log* to the *Summary*. Then post the *Summary* in a visible location so that your employees are aware of injuries and illnesses occurring in their workplace.

You don't post the Log. You post only the Summary at the end of the year.



OSHA's Form 300 (Rev. 01/2004)

Log of Work-Related Injuries and Illnesses

Attention: This form contains information relating to employee health and must be used in a manner that protects the confidentiality of employees to the extent possible while the information is being used for occupational safety and health purposes.

Year 20__ __

U.S. Department of Labor
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

You must record information about every work-related death and about every work-related injury or illness that involves loss of consciousness, restricted work activity or job transfer, days away from work, or medical treatment beyond first aid. You must also record significant work-related injuries and illnesses that are diagnosed by a physician or licensed health care professional. You must also record work-related injuries and illnesses that meet any of the specific recording criteria listed in 29 CFR Part 1904.8 through 1904.12. Feel free to use two lines for a single case if you need to. You must complete an Injury and Illness Incident Report (OSHA Form 301) or equivalent form for each injury or illness recorded on this form. If you're not sure whether a case is recordable, call your local OSHA office for help.

Establishment name XYZ Company

City Anywhere State MA

Identify the person			Describe the case			Classify the case (CHECK ONLY ONE box for each case based on the most serious outcome for that case:)				Enter the number of days the injured or ill worker was:		Check the "Injury" column or choose one type of illness:					
								Remained at Work				(M)					
(A) Case no.	(B) Employee's name	(C) Job title (e.g. Welder)	(D) Date of injury or onset of illness	(E) Where the event occurred (e.g. Loading dock north end)	(F) Describe injury or illness, parts of body affected, and object/substance that directly injured or made person ill (e.g. Second degree burns on right forearm from acetylene torch)	Death (G)	Days away from work (H)	Job transfer or restriction (I)	Other recordable cases (J)	Away from work (K)	On job transfer or restriction (L)	Injury (1)	Skin disorders (2)	Respiratory conditions (3)	Poisoning (4)	Hearing loss (5)	All other illnesses (6)
1	Mark Bagin	Welder	5/25	basement	fracture, left arm and left leg, fell from ladder	☐	☑	☐	☐	12 days	15 days	☑	☐	☐	☐	☐	☐
2	Shana Alexander	Foundry man	7/2	pouring deck	poisoning from lead fumes	☐	☐	☑	☐	___ days	30 days	☐	☐	☐	☑	☐	☐
3	Sam Sander	Electrician	8/5	2nd floor storeroom	broken left foot, fell over box	☐	☑	☐	☐	7 days	30 days	☑	☐	☐	☐	☐	☐
4	Ralph Boccella	Laborer	9/17	packaging dept	Back strain lifting boxes	☐	☑	☐	☐	3 days	___ days	☑	☐	☐	☐	☐	☐
5	Jarrod Daniels	Machine opr.	10/23	production floor	dust in eye	☐	☐	☐	☑	___ days	___ days	☑	☐	☐	☐	☐	☐
			/			☐	☐	☐	☐	___ days	___ days	☐	☐	☐	☐	☐	☐
			/			☐	☐	☐	☐	___ days	___ days	☐	☐	☐	☐	☐	☐
			/			☐	☐	☐	☐	___ days	___ days						

Be as specific as possible. You can use two lines if you need more room.

Revise the log if the injury or illness progresses and the outcome is more serious than you originally recorded for the case. Cross out, erase, or white-out the original entry.

Choose ONLY ONE of these categories. Classify the case by recording the most serious outcome of the case, with column G (Death) being the most serious and column J (Other recordable cases) being the least serious.

Note whether the case involves an injury or an illness.

OSHA's Form 300 (Rev. 01/2004)

Log of Work-Related Injuries and Illnesses

Attention: This form contains information relating to employee health and must be used in a manner that protects the confidentiality of employees to the extent possible while the information is being used for occupational safety and health purposes.

Year 20__ __

U.S. Department of Labor
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

You must record information about every work-related death and about every work-related injury or illness that involves loss of consciousness, restricted work activity or job transfer, days away from work, or medical treatment beyond first aid. You must also record significant work-related injuries and illnesses that are diagnosed by a physician or licensed health care professional. You must also record work-related injuries and illnesses that meet any of the specific recording criteria listed in 29 CFR Part 1904.8 through 1904.12. Feel free to use two lines for a single case if you need to. You must complete an Injury and Illness Incident Report (OSHA Form 301) or equivalent form for each injury or illness recorded on this form. If you're not sure whether a case is recordable, call your local OSHA office for help.

Establishment name _____

City _____ State _____

Identify the person			Describe the case			Classify the case (CHECK ONLY ONE box for each case based on the most serious outcome for that case:)				Enter the number of days the injured or ill worker was:		Check the "Injury" column or choose one type of illness:					
								Remained at Work				(M)					
(A) Case no.	(B) Employee's name	(C) Job title (*e.g., Welder*)	(D) Date of injury or onset of illness	(E) Where the event occurred (*e.g., Loading dock north end*)	(F) Describe injury or illness, parts of body affected, and object/substance that directly injured or made person ill (*e.g., Second degree burns on right forearm from acetylene torch*)	Death (G)	Days away from work (H)	Job transfer or restriction (I)	Other record-able cases (J)	Away from work (K)	On job transfer or restriction (L)	Injury (1)	Skin disorder (2)	Respiratory condition (3)	Poisoning (4)	Hearing loss (5)	All other illnesses (6)
			/ month/day			☐	☐	☐	☐	____ days	____ days	☐	☐	☐	☐	☐	☐

OSHA's Form 300A (Rev. 01/2004)

Summary of Work-Related Injuries and Illnesses

Year 20__ __

U.S. Department of Labor
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

All establishments covered by Part 1904 must complete this Summary page, even if no work-related injuries or illnesses occurred during the year. Remember to review the Log to verify that the entries are complete and accurate before completing this summary.

Using the Log, count the individual entries you made for each category. Then write the totals below, making sure you've added the entries from every page of the Log. If you had no cases, write "0."

Employees, former employees, and their representatives have the right to review the OSHA Form 300 in its entirety. They also have limited access to the OSHA Form 301 or its equivalent. See 29 CFR Part 1904.35, in OSHA's recordkeeping rule, for further details on the access provisions for these forms.

Number of Cases

Total number of deaths	Total number of cases with days away from work	Total number of cases with job transfer or restriction	Total number of other recordable cases
_____	_____	_____	_____
(G)	(H)	(I)	(J)

Number of Days

Total number of days away from work	Total number of days of job transfer or restriction
_____	_____
(K)	(L)

Injury and Illness Types

Total number of . . .	(M)		
(1) Injuries	_____	(4) Poisonings	_____
		(5) Hearing loss	_____
(2) Skin disorders	_____	(6) All other illnesses	_____
(3) Respiratory conditions	_____		

Post this Summary page from February 1 to April 30 of the year following the year covered by the form.

Public reporting burden for this collection of information is estimated to average 58 minutes per response, including time to review the instructions, search and gather the data needed, and complete and review the collection of information. Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number. If you have any comments about these estimates or any other aspects of this data collection, contact: US Department of Labor, OSHA Office of Statistical Analysis, Room N-3644, 200 Constitution Avenue, NW, Washington, DC 20210. Do not send the completed forms to this office.

Establishment information

Your establishment name _____

Street _____

City _____ State _____ ZIP _____

Industry description (*e.g., Manufacture of motor truck trailers*)

_____

Standard Industrial Classification (SIC), if known (*e.g., 3715*)

____ ____ ____ ____

OR

North American Industrial Classification (NAICS), if known (e.g., 336212)

____ ____ ____ ____ ____ ____

Employment information *(If you don't have these figures, see the Worksheet on the back of this page to estimate.)*

Annual average number of employees _____

Total hours worked by all employees last year _____

Sign here

Knowingly falsifying this document may result in a fine.

I certify that I have examined this document and that to the best of my knowledge the entries are true, accurate, and complete.

_____ _____
Company executive Title

( ) - / /
Phone Date

Optional

Worksheet to Help You Fill Out the Summary

At the end of the year, OSHA requires you to enter the average number of employees and the total hours worked by your employees on the summary. If you don't have these figures, you can use the information on this page to estimate the numbers you will need to enter on the Summary page at the end of the year.

How to figure the average number of employees who worked for your establishment during the year:

❶ ***Add*** the total number of employees your establishment paid in all pay periods during the year. Include all employees: full-time, part-time, temporary, seasonal, salaried, and hourly.

The number of employees paid in all pay periods = ❶ _____

❷ ***Count*** the number of pay periods your establishment had during the year. Be sure to include any pay periods when you had no employees.

The number of pay periods during the year = ❷ _____

❸ ***Divide*** the number of employees by the number of pay periods.

❶ _____ / ❷ _____ = ❸ _____

❹ ***Round the answer*** to the next highest whole number. Write the rounded number in the blank marked *Annual average number of employees*.

The number rounded = ❹ _____

For example, Acme Construction figured its average employment this way:

For pay period...	Acme paid this number of employees...
1	10
2	0
3	15
4	30
5	40
▼	▼
24	20
25	15
26	+10
	830

Number of employees paid = 830 ❶

Number of pay periods = 26 ❷

830 / 26 = 31.92 ❸

31.92 rounds to 32 ❹

32 is the annual average number of employees

How to figure the total hours worked by all employees:

Include hours worked by salaried, hourly, part-time and seasonal workers, as well as hours worked by other workers subject to day to day supervision by your establishment (e.g., temporary help services workers).

Do not include vacation, sick leave, holidays, or any other non-work time, even if employees were paid for it. If your establishment keeps records of only the hours paid or if you have employees who are not paid by the hour, please estimate the hours that the employees actually worked.

If this number isn't available, you can use this optional worksheet to estimate it.

Optional Worksheet

_____ ***Find*** the number of full-time employees in your establishment for the year.

X _____ ***Multiply*** by the number of work hours for a full-time employee in a year.

_____ This is the number of full-time hours worked.

\+ _____ ***Add*** the number of any overtime hours as well as the hours worked by other employees (part-time, temporary, seasonal)

_____ ***Round*** the answer to the next highest whole number. Write the rounded number in the blank marked *Total hours worked by all employees last year.*

U.S. Department of Labor
Occupational Safety and Health Administration

OSHA's Form 301
Injury and Illness Incident Report

Attention: This form contains information relating to employee health and must be used in a manner that protects the confidentiality of employees to the extent possible while the information is being used for occupational safety and health purposes.

U.S. Department of Labor
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

This *Injury and Illness Incident Report* is one of the first forms you must fill out when a recordable work-related injury or illness has occurred. Together with the *Log of Work-Related Injuries and Illnesses* and the accompanying *Summary,* these forms help the employer and OSHA develop a picture of the extent and severity of work-related incidents.

Within 7 calendar days after you receive information that a recordable work-related injury or illness has occurred, you must fill out this form or an equivalent. Some state workers' compensation, insurance, or other reports may be acceptable substitutes. To be considered an equivalent form, any substitute must contain all the information asked for on this form.

According to Public Law 91-596 and 29 CFR 1904, OSHA's recordkeeping rule, you must keep this form on file for 5 years following the year to which it pertains.

If you need additional copies of this form, you may photocopy and use as many as you need.

Completed by _____

Title _____

Phone (_____)_____--_____ **Date** ____/ ____/ ____

Information about the employee

1) **Full name** _____

2) **Street** _____

City _____ **State** _____ **ZIP** _____

3) **Date of birth** _____ / ____ / _____

4) **Date hired** _____ / ____ / _____

5) ❒ **Male**
❒ **Female**

Information about the physician or other health care professional

6) **Name of physician or other health care professional** _____

_____

7) **If treatment was given away from the worksite, where was it given?**

Facility _____

Street _____

City _____ **State** _____ **ZIP** _____

8) **Was employee treated in an emergency room?**
❒ **Yes**
❒ **No**

9) **Was employee hospitalized overnight as an in-patient?**
❒ **Yes**
❒ **No**

Information about the case

10) **Case number from the *Log*** _____ *(Transfer the case number from the Log after you record the case.)*

11) **Date of injury or illness** _____ / ____ / _____

12) **Time employee began work** _____ **AM / PM**

13) **Time of event** _____ **AM / PM** ☐ **Check if time cannot be determined**

14) ***What was the employee doing just before the incident occurred?*** **Describe the activity, as well as the tools, equipment, or material the employee was using. Be specific.** *Examples:* **"climbing a ladder while carrying roofing materials"; "spraying chlorine from hand sprayer"; "daily computer key-entry."**

15) ***What happened?*** **Tell us how the injury occurred.** *Examples:* **"When ladder slipped on wet floor, worker fell 20 feet"; "Worker was sprayed with chlorine when gasket broke during replacement"; "Worker developed soreness in wrist over time."**

16) ***What was the injury or illness?*** **Tell us the part of the body that was affected and how it was affected; be more specific than "hurt," "pain," or sore."** *Examples:* **"strained back"; "chemical burn, hand"; "carpal tunnel syndrome."**

17) ***What object or substance directly harmed the employee?*** *Examples:* **"concrete floor"; "chlorine"; "radial arm saw."** *If this question does not apply to the incident, leave it blank.*

18) ***If the employee died, when did death occur?*** **Date of death** _____ / ____ / _____

Public reporting burden for this collection of information is estimated to average 22 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Persons are not required to respond to the collection of information unless it displays a current valid OMB control number. If you have any comments about this estimate or any other aspects of this data collection, including suggestions for reducing this burden, contact: US Department of Labor, OSHA Office of Statistical Analysis, Room N-3644, 200 Constitution Avenue, NW, Washington, DC 20210. Do not send the completed forms to this office.

If You Need Help...

If you need help deciding whether a case is recordable, or if you have questions about the information in this package, feel free to contact us. We'll gladly answer any questions you have.

- **Visit us online at www.osha.gov**
- **Call your OSHA Regional office and ask for the recordkeeping coordinator**

  or

- **Call your State Plan office**

Federal Jurisdiction

Region 1 - 617 / 565-9860
Connecticut; Massachusetts; Maine; New Hampshire; Rhode Island

Region 2 - 212 / 337-2378
New York; New Jersey

Region 3 - 215 / 861-4900
DC; Delaware; Pennsylvania; West Virginia

Region 4 - 404 / 562-2300
Alabama; Florida; Georgia; Mississippi

Region 5 - 312 / 353-2220
Illinois; Ohio; Wisconsin

Region 6 - 214 / 767-4731
Arkansas; Louisiana; Oklahoma; Texas

Region 7 - 816 / 426-5861
Kansas; Missouri; Nebraska

Region 8 - 303 / 844-1600
Colorado; Montana; North Dakota; South Dakota

Region 9 - 415 / 975-4310

Region 10 - 206 / 553-5930
Idaho

State Plan States

Alaska - 907 / 269-4957

Arizona - 602 / 542-5795

California - 415 / 703-5100

*Connecticut - 860 / 566-4380

Hawaii - 808 / 586-9100

Indiana - 317 / 232-2688

Iowa - 515 / 281-3661

Kentucky - 502 / 564-3070

Maryland - 410 / 527-4465

Michigan - 517 / 322-1848

Minnesota - 651 / 284-5050

Nevada - 702 / 486-9020

*New Jersey - 609 / 984-1389

New Mexico - 505 / 827-4230

*New York - 518 / 457-2574

North Carolina - 919 / 807-2875

Oregon - 503 / 378-3272

Puerto Rico - 787 / 754-2172

South Carolina - 803 / 734-9669

Tennessee - 615 / 741-2793

Utah - 801 / 530-6901

Vermont - 802 / 828-2765

Virginia - 804 / 786-6613

Virgin Islands - 340 / 772-1315

Washington - 360 / 902-5554

Wyoming - 307 / 777-7786

*Public Sector only

U.S. Department of Labor
Occupational Safety and Health Administration

U.S. Department of Labor
Occupational Safety and Health Administration

Have questions?

If you need help in filling out the *Log* or *Summary,* or if you have questions about whether a case is recordable, contact us. We'll be happy to help you. You can:

- Visit us online at: **www.osha.gov**
- Call your regional or state plan office. You'll find the phone number listed inside this cover.

USACE PRIME CONTRACTOR

US Army Corps of Engineers

Monthly Record of Work Related Injuries/Illnesses & Exposure

Month _____

In accordance with the provisions of EM 385-1-1, Section 01 Program Management, Paragraph 01.D Accident Reporting and Recording, sub-paragraphs 01.D.05, you (the Prime Contractor) shall provide a monthly record of all exposure and accident experience incidental to the work (this includes exposure and accident experience of the Prime Contractor and its subcontractor(s)). As a minimum, these records shall include exposure work hours and a record or occupational injuries and illneses that include the data elements listed below. Definitional criteria for each data element is found in 29 CFR Part 1904. If the maintenance of OSHA 300 Logs are required by OSHA, most of this information can be obtained from those logs. If data on log provided below is revised after it is submitted to USACE, Contractor shall provide a revised report to the GDA. You must complete the USACE ENG Form 3394, Report of Accident Investigation Report for all recordable accidents. If you're not sure whether a case is recordable, call your local Safety and Occupational Health Office for help.

USACE Command	Little Rock District
Contractor Name	
Contract Number	
Project Title	
City & State	
USACE Office	

Contractor	Prime or Subcontractor		Date Employee began work	Where the event occurred	Describe the injury or illness	Death	Days Away From Work	Job Transfer or Restriction	Other Recordable Cases	Death	Number of Days		Number of Injuries / Illnesses					
Labor Classification	Age	Gender	Date of injury or onset of illness								On job transfer or restriction (days)	Away from work (days)	Injuries	Skin Disorder	Respiratory Conditions	Poisoning	Hearing Loss	All Other Illnesses
Totals:																		

Exposure Hours	Certification of Record
Month _____ Year to Date _____	Name of Person Submitting Record: _____ Signature: _____ Date: _____

USACE PRIME CONTRACTOR

US Army Corps of Engineers

Monthly Record of Work Related Injuries/Illnesses & Exposure

Month _____

Contractor / Trade	P or S	Exposure Hours		Number of Cases				Number of Days		Number of Injuries / Illnesses						Rates		
		Current Period	Year to Date	Death Cases	Days Away form Work Cases	Transfer or Restriction Cases	Other Reportable Cases	Days Away form Work	Job Transfer Days	Injuries	Skin Disorder	Respiratory Conditions	Poisoning	Hearing Loss	All Other Illnesses	Lost Time Frequency Rate	Contractor DART Rate	Contractor Day Count
Totals:																		

Project Signage

Contractor's Construction Project Identification Sign

The use of signs to identify Corps managed or supervised design, construction, and rehabilitation projects - both for military and civil works - is an important part of efforts to keep the public informed of Corps work. For this purpose, a construction project sign package has been adopted. This package consists of two signs: one for project identification and the other to show on-the-job safety performance of the contractor. These two signs shall be displayed side by side and mounted for reading by passing viewers. Exact placement location will be designated by the contracting officer's representative.

The panel sizes and graphic formats have been standardized for visual consistency throughout all Corps operations. Panels are fabricated using HDO plywood or aluminum with dimensional lumber uprights and bracing. The sign faces are non-reflective vinyl.

All legends shall be die-cut or computer-cut in the sizes and typefaces specified and applied to the white panel background following the graphic formats described on the following pages. The Communication Red panel on the left side of the construction project sign with Corps Signature (reverse version) is screen-printed onto the white background.

A display of these two signs is shown in Figures 1 and 2 on the pages 2 and 4. Mounting and fabrication details are provided on pages 4 and 5. Special applications or situations not covered in these guidelines should be referred to the district Sign Program Manager.

A sample of the Construction Project Identification sign showing how this panel is use to identify the work project is provided in Figure 1. The graphic format for this 4'x 6' sign panel follows the legend guidelines and layout as specified below. The large 4'x 4' section of the panel on the right shall be white with black legend. The 2'x 4' section of the sign on the left with the full Corps Signature (reverse version) shall be screen-printed Communication Red on the white background.

The Construction Project Identification sign shall be placed with the Safety Performance sign shown in Figure 2.

Project sign design and layout by legend group:

Legend Group 1: One- to two-line description of Corps relationship to project.
Color: White
Typeface: 1.25" Helvetica Regular
Maximum line length: 19"

Legend Group 2: Division or District Name (optional). Placed below 10.5" reverse Signature (6" Castle).
Color: White
Typeface: 1.25" Helvetica Regular

Legend Group 2a: One- to three-line identification of Military or Civil Works sponsor (optional). Place below Corps Signature to cross-align with Group 5a-b.
Color: White
Typeface: 1.25" Helvetica Regular
Maximum line length: 19"

3″
21″
3″
42″
3″
3″
9″
10.5″
2.5″
6″
10.5″
6.5″
1.25″
.625″
1.25″
Design and Construction
Supervised by:
US Army Corps
of Engineers
1.25″
1.25″
St. Louis District
U.S.ARMY
7.875″
Replacement of
North Spillway
Gates
3″
1.5″
3″
1.5″
3″
12″
(varies)
x
Vertically center the featured text group for the
project location (below), depending on the
number of text lines in the above project title.
Lock and Dam 12
Mississippi River
1.5″
.75″
1.5″
24″
(varies)
x
Contractor:
Oscar Construction Co.
Kansas City, Missouri
Consulting Engineer:
Wilmington, Rotheau, and
Eddings Engineering, Inc.
Chicago, Illinois
1.25″
.625″
(etc.)
9″
2.25″
21″
1″
21″
2″

Project Signage

All typography is flush left and rag right, upper and lower case with initial capitals only as shown. Letter- and word-spacing to follow Corps standards as specified in Appendix D.

Sign Type	Legend Size	Panel Size	Post Size	Specification Code	Mounting Height	Color Bkg/Lgd
CID-01	Various	4’ x 6’	4” x 4”	HDO-3	48”	WH-RD/BK

Contractor’s Safety Performance Sign

Each contractor’s safety record shall be posted on Corps managed or supervised construction projects and mounted with the Construction Project Identification sign specified on pages 1-2. The graphic format, color, size and type-faces used on the sign shall be reproduced exactly as specified below. The title with First Aid logo in the top section of the sign, and the performance record captions are standard for all signs of this type. Legend groups 2 and 3 identify the project and the contractor and shall be placed on the sign as shown.

Safety record numbers are mounted on individual metal plates and are screw-mounted to the background to allow for daily revisions to posted safety performance record. Special applications or situations not covered in these guidelines should be referred to the district Sign Program Manager.

Project Safety Performance sign design and layout by legend group:

Legend Group 1: Standard two-line title “Safety is a Job Requirement” with 8” (outside diameter) Safety Green first aid logo.
Color: To match Pantone system 347
Typeface: 3" Helvetica Bold
Color: Black

Legend Group 2: One- to two-line project title legend describes the work being done under this contract and name of host project.
Color: Black
Typeface: 1.5" Helvetica Regular
Maximum line length: 42"

Legend Group 3: One- to two-line identification: name of prime contractor and city, state address. Color: Black
Typeface: 1.5" Helvetica Regular
Maximum line length: 42"

Legend Group 4: Standard safety record captions as shown.
Color: Black
Typeface: 1.25” Helvetica Regular

Replaceable numbers shall be mounted on white .060 aluminum plates and screw-mounted to background.
Color: Black
Typeface: 3" Helvetica Regular Plate size: 2.5" x 4.5"

Project Signage

All typography is flush left and rag right, upper and lower case with initial capitals only as shown.

Sign Type	Legend Size	Panel Size	Post Size	Specification Code	Mounting Height	Color Bkg/Lgd
CID-02	Various	4’ x 6’	4” x 4”	HDO-3	48”	WH-RD/SG

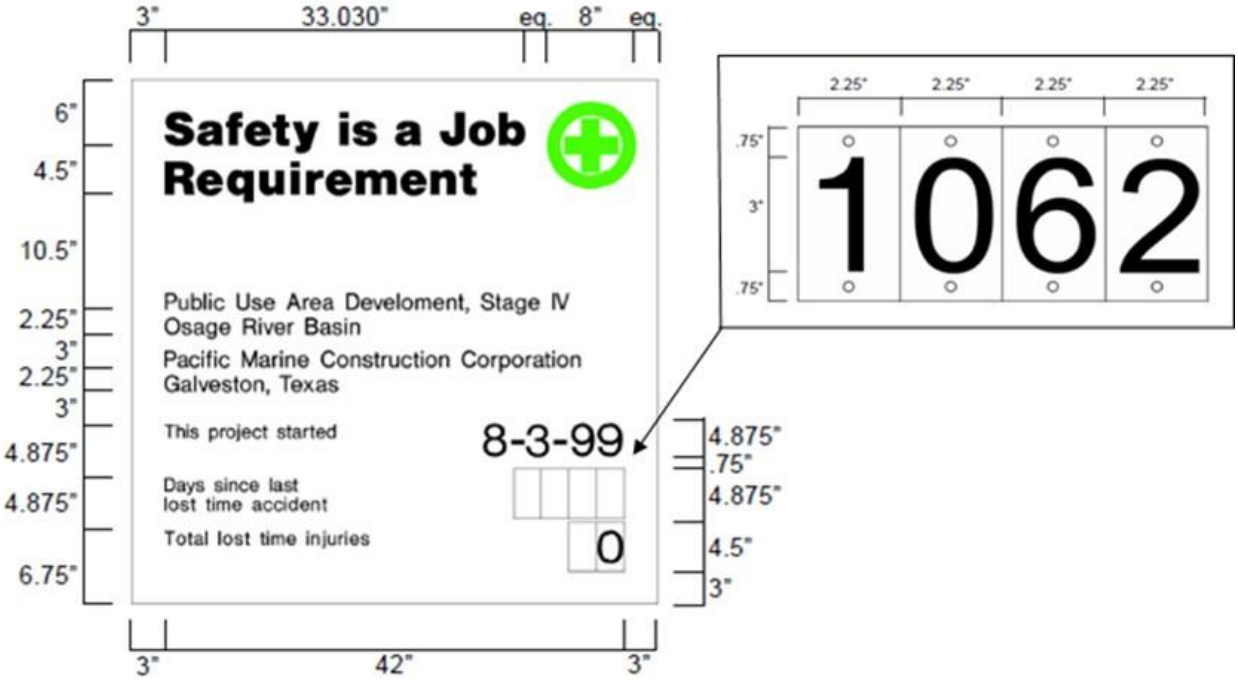


Figure 2. Safety Performance Sign

Fabrication and Mounting Guidelines

All Construction Project Identification signs and Safety Performance signs shall be fabricated and installed as described below. The signs shall be erected at a location designated by the contracting officer representative and shall conform to the size, format, and typographic standards shown on pages 2 and 4.

Shown below the mounting diagram is a panel layout grid with spaces provided for project information. Photocopy this page and use as a worksheet when preparing sign legend orders. For additional information on the proper method to prepare sign panel graphics, contact the district Sign Program Manager.

The sign panels shall be fabricated from .75" High Density Overlay Plywood. Sign graphics shall be prepared on a white non-reflective vinyl film with positionable adhesive backing.

All graphics except for the Communication Red background with Corps Signature on the project sign shall be die-cut or computer-cut non-reflective vinyl, pre-spaced legends prepared in the sizes and typefaces specified and applied to the background panel following the graphic formats shown on pages 2 and 3.

Project Signage

The 2'x 4' Communication Red panel (to match Pantone system 032) with full Corps Signature (reverse version) shall be screen-printed on the white background. Identification of the district or division may be applied under the signature with white cut vinyl letters prepared to Corps standards.

Drill and insert six (6) .375" T-nuts from the front face of the HDO sign panel. Position holes as shown. Flange of T-nut shall be flush with sign face. Apply graphic panel to prepared HDO plywood panel following manufacturers' instructions.

Sign uprights shall be structural grade 4" x 4" treated Douglas Fir or Southern Yellow Pine, No.1 or better. Posts shall be 12' long. Drill six (6) .375" mounting holes in uprights to align with T-nuts in sign panel. Countersink (.5") back of hole to accept socket head cap screw (4" x .375").

Imbedding the assembled sign panel and uprights in 4' holes. Local soil conditions and/or wind loading may require bolting additional 2" x 4" struts on inside face of uprights to reinforce installation as shown in Figure 3.

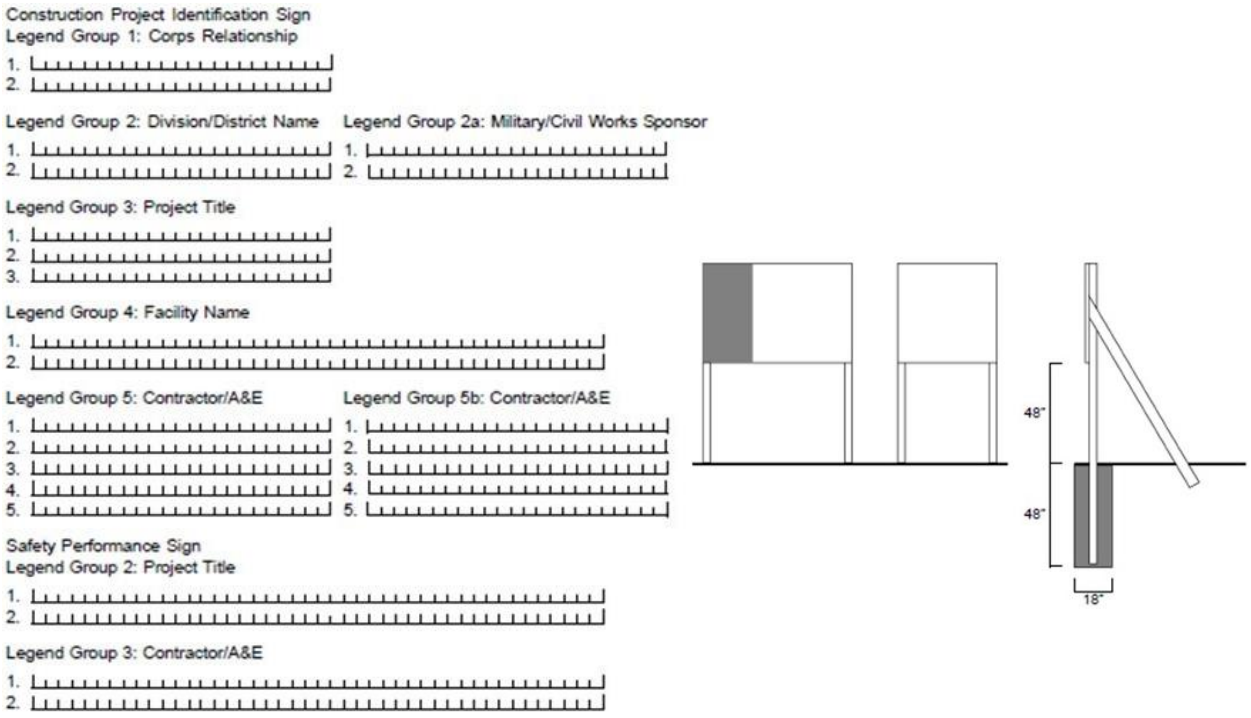


Figure 3. Legend Groupings and Mounting Requirements

Project Signage

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USACE – Little Rock District

TO BE COMPLETED BY CORPS OF ENGINEERS POINT OF CONTACT

Project Office or Contract Location: _____
Contract #: _____
Corps of Engineers POC: _____
Reference Info: _____

National Background Screening Consent/Release Form

Applicant's **Legal** Name (printed)

_____

Social Security Number _____ Date of Birth _____

Applicant's Address _____

City _____State _____Zip _____

I, _____, authorize and give consent for the above named organization to obtain information regarding myself. This includes the following:

- Local & National Criminal background records/information
- All 50 State Sex Offender Registries
- Full Address Trace
- Social Security Verification

I the undersigned, authorize this information to be obtained either in writing or via telephone in connection with my application. Any person, firm or organization providing information or records in accordance with this authorization is released from any and all claims of liability for compliance. Such information will be held in confidence in accordance with the organization's guidelines.

Printed Name: _____ Date**:**_____

Signature: _____

Payment Information (Include the following CC information):

Name on Card _____
Card Type (Visa or MC) -
Card Number _____
Card Expiration Date _____
Security Code (three digit code on the back of the card) _____
Zip Code (of billing address) _____
Fax Completed form to SSCI @ 866-996-1292
Normal cost for this service is $20.00. For questions please call 866-996-7412.

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SECTION TABLE OF CONTENTS
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01 1100
STATEMENT OF WORK

Contents

1.0 PROJECT OBJECTIVES..... 3
1.1 SECTION ORGANIZATION..... 3
2.0 SCOPE..... 4
2.1 ACCESS CONTROL POINTS..... 4
2.2 SITE..... 5
2.3 GOVERNMENT FURNISHED GOVERNMENT INSTALLED EQUIPMENT..... 6
2.4 FURNITURE REQUIREMENTS..... 6
2.5 VSS, INTRUSION DETECTION SYSTEM, AND DURESS ALARM..... 6
2.6 GOVERNMENT FURNISHED CONTRACTOR INSTALLED EQUIPMENT..... 7
3.0 ACCESS CONTROL POINTS..... 7
3.1 GENERAL REQUIREMENTS..... 7
3.2 FUNCTIONAL AND OPERATIONAL REQUIREMENTS..... 8
3.3 SITE FUNCTION REQUIREMENTS..... 10
3.4 SITE AND LANDSCAPE REQUIREMENTS..... 11
3.5 ARCHITECTURAL REQUIREMENTS..... 14
3.6 STRUCTURAL REQUIREMENTS..... 19
3.7 THERMAL PERFORMANCE..... 21
3.8 PLUMBING requirements..... 21
3.9 COMMUNICATIONS AND SECURITY SYSTEMS..... 21
3.10 ELECTRICAL REQUIREMENTS..... 27
3.11 HEATING VENTILATION and AIR CONDITIONING REQUIREMENTS..... 32
3.12 ENERGY CONSERVATION REQUIREMENTS..... 33
3.13 FIRE PROTECTION REQUIREMENTS..... 33
3.14 SUSTAINABLE DESIGN..... 34
3.15 EQUIPMENT AND FURNITURE REQUIREMENTS..... 34
3.16 FACILITY SPECIFIC REQUIREMENTS..... 35
4.0 APPLICABLE CRITERIA..... 36
4.1 INDUSTRY CRITERIA..... 36
4.2 MILITARY CRITERIA..... 42
5.0 GENERAL TECHNICAL REQUIREMENTS..... 43
5.1 SITE PLANNING AND DESIGN..... 44
5.2 SITE ENGINEERING..... 45
5.3 COMMISSIONING..... 46
5.4 ARCHITECTURE AND INTERIOR DESIGN..... 47
5.5 STRUCTURAL DESIGN..... 50

5.6 THERMAL PERFORMANCE..... 51
5.7 PLUMBING AND WATER CONSUMING EQUIPMENT..... 52
5.8 ELECTRICAL AND COMMUNICATION SYSTEMS..... 53
5.9 HEATING, VENTILATING, AND AIR CONDITIONING..... 57
5.10 ENERGY CONSERVATION..... 58
5.11 FIRE PROTECTION..... 59
5.12 SUSTAINABLE DESIGN..... 61
5.13 SECURITY (ANTITERRORISM STANDARDS)..... 61
5.14 Cybersecurity..... 61
6.0 PROJECT SPECIFIC REQUIREMENTS..... 61
6.1 GENERAL..... 61
6.2 APPROVED DEVIATIONS..... 61
6.3 SITE PLANNING AND DESIGN..... 62
6.4 SITE ENGINEERING..... 68
6.5 ARCHITECTURE..... 75
6.6 INTERIOR DESIGN..... 76
6.7 STRUCTURAL DESIGN..... 77
6.8 PLUMBING..... 77
6.9 HEATING, VENTILATING, AND AIR CONDITIONING..... 79
6.10 FIRE PROTECTION..... 81
6.11 SITE ELECTRICAL AND COMMUNICATION SYSTEM..... 83
6.12 FACILITY ELECTRICAL AND TELECOMMUNICATION SYSTEMS..... 84
6.13 SUSTAINABLE DESIGN..... 85
6.14 SECURITY (ANTITERRORISM STANDARDS)..... 85
6.15 FRCS Cybersecurity..... 85

-- End of Section Table of Contents --

SECTION 01 11 00

STATEMENT OF WORK

1.0 PROJECT OBJECTIVES

The project objective is to design and construct facilities for the military that are consistent with the design and construction practices used for civilian sector projects that perform similar functions to the military projects.

It is the Army's objective that these facilities, buildings, and functions will have a 50-year useful life. The design and construction shall provide an appropriate level of quality to ensure the continued use of the facility over that time period with the application of reasonable preventive maintenance and repairs that would be industry-acceptable to a major civilian sector project OWNER. The facility design shall consider that the Army may repurpose the use of the facility over the 50-year life. The Army's intent is to install products and materials of good quality that meet industry standard average life that corresponds with the period of performance expected before a major renovation or repurpose. The design shall be flexible and adaptable to possible future uses different than the current to the extent practical while still meeting the operational and functional requirements defined within. Flexibility is achieved through design of more flexible structural load-bearing wall and column system arrangements. The site infrastructure will have at least a 50-year life expectancy with industry-accepted maintenance and repair cycles. Develop the project site for efficiency and to convey a sense of unity or connectivity with the adjacent facilities and buildings and with the Installation as a whole.

Requirements stated in this contract are minimums. Innovative, creative, and life cycle cost effective solutions, which meet or exceed these requirements are encouraged. Further, the OFFEROR is encouraged to seek solutions that will expedite construction (panelization, pre-engineered, etc.) and shorten the schedule. **The intent of the Government is to emphasize the placement of funds into functional/operational requirements. Materials and methods shall reflect this by choosing the most economical Type of Construction allowed by code for this occupancy/project allowing the funding to be reflected in the quality of interior/exterior finishes and systems selected.**

References to Surface Deployment and Distribution Command Transportation Engineering Agency (SDDC-TEA) shall also be interpreted to mean U.S. Army Transportation Command Transportation Engineering Agency (ARTRANSTEA).

1.1 SECTION ORGANIZATION

This Section is organized under six major paragraphs.

1) Paragraph 1.0 is intended to define the project objectives and to provide a comparison between the military facility(ies), buildings, and functions and comparable civilian type facility(ies), buildings, and functions.
2) Paragraph 2.0 describes the scope of the project.
3) Paragraph 3.0 provides the functional, operational, and facility specific design criteria for the specific facility type(s) included in this contract or task order.
4) Paragraph 4.0 lists applicable industry and government design criteria, generally applicable to all facility types, unless otherwise indicated in the Section. It is not intended to be all-inclusive. Other industry

and government standards may be used, where necessary to produce professional designs, unless they conflict with those listed.
5) Paragraph 5.0 contains Army Standard Design Criteria, generally applicable to all facility types, unless otherwise indicated in the Section.
6) Paragraph 6.0 contains Installation and project specific criteria supplementing the other five paragraphs.

2.0 SCOPE

2.1 ACCESS CONTROL POINTS

Provide an installation access control point (ACP), which will allow safe, convenient vehicular and pedestrian access to the installation, while ensuring antiterrorism and force protection (AT/FP) measures are implemented. The project is based on, and shall comply with, the Army Standard for ACPs and the Department of Army ACPs Standard Design Criteria (ACP-SDC). The ACP functions are a corridor through which all vehicles and pedestrians pass when entering or exiting an installation. The ACP personnel perform identification verification procedures and control the active barriers that deny or permit entry on to the installation.

Contractor is required to submit shop drawings for passive vehicle barriers and active vehicle barriers (AVBs) incorporated into the design.

In addition, the ACP shall be provided with a video surveillance systems (VSS) camera system, security lighting, Intrusion Detection System (IDS), duress alarm systems, communications system, Local Area Network (LAN), back-up power system, traffic control system, wrong way detection system, AVBs and control system, and crash rated passive vehicle barriers. The VSS system shall include cameras, digital video recorders or network video recorders, monitors, and controls. Cameras shall be provided at the overwatch area, identification (ID) check area, vehicle inspection areas, and AVB areas. Camera monitoring shall occur at the command and control function and at the central monitoring station of the installation. Lighting shall be provided at the approach zone, access control zone, response zone, vehicle search (inspection) areas, active barrier areas and parking areas. A back-up power system shall be provided with a generator and uninterruptible power supply (UPS). Both UPS and generator will be Contractor Furnished and Contractor Installed (CFCI)

2.1.1 BUILDINGS

The project includes the design of two buildings: the Visitor Control Center (VCC) and the Gatehouse. Both structures will be developed in accordance with the Army Access Control Points (ACPs) Standard Design as well as the Pine Bluff Arsenal Installation Planning Standards (IPS).

2.1.1.1 VISITOR CONTROL CENTER (VCC)

The VCC Building will encompass 5,000 gross square feet (GSF) and is designed to accommodate the operational needs of two distinct functions and departments.

- VCC Pass and ID Staff
- Commercial Truck Processing (Traffic) and Quality Assurance Specialist Ammunition Surveillance (QASAS)

The building program combines the requirements of the ACP Standard 3 Processor Visitor Control Center (VCC) with the Commercial Truck Processing

and Quality Assurance Specialist Surveillance functions. As a result, the facility differs from a typical standalone VCC by incorporating additional operational, inspection, processing, and surveillance program spaces necessary to support commercial vehicle screening and compliance activities. The combined program results in increased gross area from the standard VCC function.

2.1.1.2 GATEHOUSE

The Gatehouse will consist of 934 gross square feet (GSF) and will primarily serve as a Command & Control area, staffed by PBA Security Forces.

2.1.2 ID CHECK AREA AND CANOPY

Provide two inbound lanes under the ID check area canopy and one guard booth for each ID check lane for a total of two guard booths.

2.1.3 TRUCK SEARCH AREA AND CANOPY

The truck search area shall consist of one inbound lane and two outbound lanes. The inbound lane and the adjoining outbound lane will be situated beneath the canopy, while the second outbound lane will be located outside the canopy. Provide one guard booth.

2.1.4 OVERWATCH BOOTH

The Overwatch Booth will be provided in a position near the active barrier and providing the ability to oversee response zone traffic and operations at the ID Check Area.

2.1.5 BALLISTIC RESISTANCE

Ballistic resistance shall be in accordance with Army ACP standards, provide where required by standard.

2.1.6 CANOPIES

Canopies are required for the ID check area and Truck search area.

2.1.7 ACCESS CONTROL POINT FUNCTIONAL AREA FACILITIES

U.S. Army Corps of Engineers (USACE) Omaha District Center of Standardization (COS) drawings can be found at: https://mrsi.erdc.dren.mil/cos/nwo/acp/.

Appendix J features the latest COS Army ACP standard design drawings, while Appendix K includes the Army ACP Standard Design Manual. Appendix L presents the Army Standard for Access Control Points.

2.1.8 STAND-OFF DISTANCE

Meet the requirements of Unified Facility Criteria (UFC) 4-010-01.

2.1.9 EQUIPMENT

None. Truck scales are not required.

2.2 SITE

Provide all site improvements necessary to support the new building facilities. Refer to Paragraph 6.

Approximate area available: approximately 11 acres

Provide all site improvements necessary to support the new facilities. The site plan located at Appendix A shall be the basis of the overall design.

Typical work under this design build contract may include, but is not limited to the following:

- Layout of all facilities
- Design of site infrastructure to include:
  - Grading
  - Pavements
  - Drainage
  - Utilities (water, sewer, gas, electrical, telecom)
  - Active and passive barriers
  - Exterior lighting
  - Pavement markings
  - Entry gate and fencing
  - Landscaping
  - Decorative signage
- Acquisition of all permits (or coordination as required for contract documents)
- Coordination with all local private and governmental entities
- VSS and security systems

2.3 GOVERNMENT FURNISHED GOVERNMENT INSTALLED EQUIPMENT

Coordinate with Government on GFGI item requirements and provide suitable structural support, brackets for projectors, video recorders, and televisions, all utility connections, and space with required clearances for all GFGI items.

All computers and related hardware, copiers, faxes, and printers are GFGI.

2.4 FURNITURE REQUIREMENTS

Provide furniture design for all spaces and functions listed in Section 3.0. Coordinate with the user to define requirements for furniture systems, movable furniture, storage systems, equipment, etc. Early coordination of furniture design is required for a complete and usable facility.

The procurement and installation of furniture is NOT included in this contract. Furniture will be provided and installed under a separate furniture vendor and installer contract. The General Contractor shall accommodate that effort with allowance for entry of the furniture vendor and installer onto this project site at the appropriate time to permit completion of the furniture installation for a complete and usable facility to coincide with the Beneficial Occupancy Date of this project. The furniture vendor and installer contract will include all electrical pre-wiring and the whips for final connection to the building electrical systems; however, the General Contractor shall make the final connections to the building electrical systems under this contract. Furthermore, the General Contractor shall provide all information and technology (IT) wiring (LAN, phone, etc.) up to and including the face plate of all freestanding and/or systems furniture desktops as applicable, the services to install the cable and face plates in the furniture, the coordination with the furniture vendor and installer to accomplish the installation at the appropriate time, and all the final IT connections to the building systems under this contract.

2.5 VSS, INTRUSION DETECTION SYSTEM, AND DURESS ALARM

The design and construction is to include, as a minimum, the interior and exterior conduit/duct pathways, rough-ins, as well as power for these systems. MILCON projects cannot pay for the actual equipment for these systems, but requires separate funding called Other Procurement Authority (OPA)

2.6 GOVERNMENT FURNISHED CONTRACTOR INSTALLED EQUIPMENT

N/A

3.0 ACCESS CONTROL POINTS

3.1 GENERAL REQUIREMENTS

3.1.1 FACILITY DESCRIPTION

The ACP must comply with the Department of Army standards for this facility type. The ACP(s) are required by the Department of Army to provide safe entry to the Installation by authorized procedures for vehicles, and/or pedestrian traffic. Both safety and security requirements are primary of the ACP criteria.

3.1.2 FACILITY RELATIONSHIPS - NOT USED

3.1.3 ACCESSIBILITY REQUIREMENTS

ACP facilities will require access by individuals with disabilities, this will be limited to the Visitor Control Center (VCC) only.

3.1.4 BUILDING AREAS

A. Gross Area: For each ACP building or structure, provide gross building area as calculated by UFC 3-101-01, "Architecturen, Chapter 2, which is the area included within the surrounding exterior walls measured from outside face of wall to inside face of wall. All building areas shall comply with Army Standard for Access Control Points.
   - VCC - maximum of 5,000 gross square feet
   - Gatehouse - maximum of 934 gross square feet
   - ID check canopy - maximum of 3,136 gross square feet
     - Guard Booth - maximum 40 gross square feet, each
   - Truck search canopy - maximum of 4,880 gross square feet
     - Guard Booth - maximum 40 gross square feet
   - Overwatch Booth - maximum 36 gross square feet

B. Net area of individual rooms - Gatehouse: For the command and control room in the facility, provide 205 square feet.

3.1.5 HOURS OF OPERATION

Operating hours are anticipated to be 24 hours per day, 7 days per week. The Contractor shall verify and confirm gate operating hours with PBA.

3.1.6 BALLISTIC REQUIREMENTS

Various buildings defined (all guard booths, command and control function of Gatehouse and Overwatch booth) require design and construction for ballistic resistance to meet applicable criteria. See Paragraph 2.1.4 BALLISTIC RESISTANCE.

3.1.7 MANDATORY REQUIREMENTS - NOT USED

3.1.8 FACILITY GOALS

A. The objective of the access control facilities is to prevent unauthorized vehicles and where required pedestrians from entering an installation. The ACP needs to be constructed with features that support the effective use of equipment, procedures, and manpower.

B. The technical and functional requirements defined herein are the standard requirements that apply to all Department of Army ACP projects.
C. The ACP is intended to provide a high level of safety while meeting the ACP standard requirements.

3.2 FUNCTIONAL AND OPERATIONAL REQUIREMENTS

3.2.1 FUNCTIONAL SPACES

A. GENERAL
1) Functional areas and facilities included in the design of ACP(s) are as listed below.
2) Coordinate the visual appearance and exterior material selections as well with the standards set by the Installation Planning Standards (Reference Appendix E) in their respective requirements. Address the impact of climate, security and geography appropriately. There may be reasons to control exterior traffic noise from entering the facilities and may require special treatment or Sound Transmission Class (STC) rating on major building components. Provide appropriate and adequate protection from the wind, and wind driven precipitation for doors and entries.

B. PRIMARY SPACES (FUNCTIONAL AREA):
1) Visitor Control Center (VCC)
No space program is available for the VCC, however the concept plan was developed per the discussion with PBA. The building shall be located to emphasize entryways and provide clear visual identification of main entry doors from the POV parking area as well as the commercial vehicle parking area. The VCC building will serve two different functions and departments. The first being VCC/Pass and I.D. Staff. VCC staff responsibilities include authenticating visitors' identities, screening them, and determining if they are eligible for access as well as processing and issuing visitors' passes. The second function occurring in this building is Commercial Truck Processing (Traffic) and Quality Assurance Specialist Ammunition Surveillance (QASAS)
a) Pass and I.D. (Visitor Processing)
- Three (3) processing positions
- Lobby - to accommodate a minimum of ten (10) people
- Space to view safety video - minimum ten (10) people (can be shared space with Traffic such as Conference room) - provide accommodations in Lobby as backup location to view safety video.
- 1 additional workstation to accommodate two computers and two monitors because they are separate systems, also need printer for this workstation
- Private Office - private office to accommodate one workstation, the remainder of the space will be utilized for storage
- Break Room - provide built-in casework to accommodate large residential refrigerator, freestanding range and ABA compliant sink; can be shared with Traffic.
- Tornado Shelter - Provide tornado shelter to meet UFC 4-023-10 Safe Havens.
- Public toilet rooms - shared with Commercial Truck Processing (Traffic) and QASAS visitors

- Staff Toilet Rooms - shared with Commercial Truck Processing (Traffic) and QASAS staff

b) Commercial Truck Processing (Traffic) and QASAS

- Six (6) staff members - two (2) private offices and four (4) open offices
- Conference Room for fourteen (14) people - which can be shared with VCC - one big table is preferred to smaller training tables
- One (1) MMT/Carrier workstation with direct access to lobby as well as pass-through window to lobby area
- Location for gun lockers - two (2) wall mounted hand-gun lockers and one (1) long gun locker - these shall be in MMT/Carrier room
- One (1) badge box - located at Traffic Check-In Area
- Two (2) workstations for UPS and FedEx - each require a standalone computer system not connected to Pine Bluff network - used to ship packages
- One (1) workstation for QASAS Inspector - they are transient, so they just need a place to sit and fill out paperwork
- Space for fifteen (15) five-drawer legal size files cabinets - more space if possible
- Break Room - provide built-in casework to accommodate large residential refrigerator, freestanding range and ABA compliant sink
- Need space for large printer (multifunction unit) as well as space for back up unit
- Public Toilet rooms - can be shared with VCC visitors
- Staff Toilet rooms - can be shared with VCC staff
- Mechanical Room (serves whole building)
- Comm Room (serves whole building) room)

2) Gatehouse

The prototype Gatehouse #1 (934 s.f.) as shown in the Army Access Point (ACP) Standard Design was used as the reference. The building shall be located as shown on the site plan in Appendix A, to give the Gatehouse guard clear views of the operations in the ID check area, of vehicles to the last turn-around, and of vehicles entering and exiting the search area. The Gatehouse shall be located adjacent to the search area. The Gatehouse facility will be an integrally colored concrete masonry unit building that includes a sloped metal roof to shed precipitation. The Gatehouse functions as the control center for the operation of the ACP. The Gatehouse personnel observe and oversee the ID check area guards and their activities. The Gatehouse personnel also monitor the activities of the search area and the status of the AVBs from direct line of site and through the VSS system. The AVB main control panel is located in the Gatehouse. Portions of the building are required to be ballistic rated. The interior will be a utilitarian space; a toilet room/latrine, Comm Room, Mechanical/Electrical Room, and Outside Storage are required.

3) ID Check Area and Canopy

The ID check area canopy shall be a metal framed structure that covers the islands of the ID check area. The clear canopy height shall be in accordance with the Army ACP Standard. The roof of the canopy can be in any configuration (gabled, hipped, low-sloped,

single sloped, or curved) that is acceptable and in accordance with the Installation requirements. Less than 11 degrees of obscuration of vision from the guard booth shall be maintained.

4) ID Check Guard Booth
Ballistic resistant guard booths shall be installed on islands adjacent to each incoming lane of traffic under the ID check canopy for protection of guards performing vehicle and passenger ID checks. Locate guard booths on a raised island in the ID check area under the ID check canopy. Guard booths can be pre-manufactured units. Guard booth roofs shall have a gradual sloped roof to avoid any moisture collection. Guard booths are not required to be Architectural Barriers Act (ABA) or Americans with Disabilities Act (ADA) compliant. Guard booths shall have sliding doors and a counter. The booths will be constructed to meet minimum ballistic requirements as defined in Army ACP Standard.

5) Truck Search Area and Canopy
The truck check area canopy shall be a metal framed structure that covers the islands of the truck search area. The clear canopy height shall be in accordance with Army ACP Standard above the road surface. The roof of the canopy can be in any configuration (gabled, hipped, low-sloped, single sloped, or curved) that is acceptable and in accordance with the Installation requirements. There will be one 5' x 10' prefabricated guard booth under this roof structure. The booth will be constructed to meet a minimum ballistic requirements as defined in the Army ACP Standard.

6) Overwatch Booth/Position
Ballistic rated 7' x 7' Overwatch booth shall be installed on a concrete pad and in accordance with Army ACP standards. A paved pad designed to accommodate at a minimum one High-Mobility Multipurpose Wheeled Vehicle (HMMWV) shall be provided. This pad will include a pedestal for AVB controls.

3.3 SITE FUNCTION REQUIREMENTS

A. GENERAL

1) Location and construction of the new facilities including associated structures, roads, parking, and utilities, and landscaping shall be as indicated and as specified herein. All site layout changes are subject to review and approval by the Government. Government supplied conceptual site plans are provided to assist the Contractor in the preparation of their proposal and design. Any errors identified shall be brought to the attention of the Contracting Officer's Representative (COR) immediately for resolution and direction. Take all professionally prudent and reasonable actions to verify the accuracy of the data provided. The Contractor is responsible for final site plans subject to approval by COS.

2) Installation physical security and antiterrorism requirements that are in addition to the requirements of this section will be included in a separate document. See Paragraph 6.0 for any additional security requirements required by the Installation physical security and antiterrorism including the requirements in this section.

3) ID Check Area
   a) The ID check area shall be configured in a manner that allows security personnel to be aware of all inbound vehicle traffic.

4) Overwatch position
   a) The overwatch position is both a location for overwatch and a potential fighting position. As such, it shall be located in a

position where a guard has some ability to defend the Installation from a potential threat in the ACP response zone.

5) Truck Search Area
   a) Truck Search area shall provide the designated space for commercial vehicles to be searched prior to entering the facility. The truck search area must also support search for those vehicles selected for search at the ID check location.
   b) The search area must not provide opportunity for undetected bypass of the search area. The design will not be based on the search area being in operation during the entire time that the ACP is open. During closure, the design must anticipate search area being unmanned at times and vehicle resistant measures and/or alarm and annunciation provided for ID check guards if a vehicle travels through toward the search area when it is closed.

B. PARKING
1) Vehicle Parking
   a) Provide clear and convenient traffic flow through and around the ACP parking areas and access drives that maximizes functional capabilities, but minimizes traffic conflicts. If required coordinate inter-modal traffic within the ACP site.
   b) Provide sufficient parking spaces for the anticipated number of personnel at the ACP.
   c) Provide sufficient parking spaces for the trucks.
   d) Pavement markings are to be in compliance with Manual on Uniform Traffic Control Devices (MUTCD). Pavement design methods are indicated in Paragraph 5.2.3.

C. ACCESS ROADWAYS, DRIVES, AND ISLANDS
1) Roadways and access drives: Design roadways to accommodate expected vehicles in the design, including, but are not limited to, passenger cars, emergency vehicles, garbage trucks, and military vehicles. The minimum roadway width in the approach and response zones is 11 feet. The minimum roadway width between the raised islands at the ID check area is 10 feet, but 11 to 12 feet is preferred. All roadway horizontal and vertical alignments must properly address the turning radius of the design vehicle(s). Pavement design methods are indicated in Paragraph 5.2.3.
2) ID check area and Truck search area islands: Traffic islands in the ID check area are to be, at a minimum, 10 feet in width. Medians at the ID check area shall be a minimum of 10 feet in width.
3) ID check and truck search area hardstand: ID check and truck search area will consist of a Portland cement concrete hardstand extending a minimum of 3 feet before and after the islands and canopy.

3.4 SITE AND LANDSCAPE REQUIREMENTS

A. SITE STRUCTURES
1) Dumpsters: one dumpster is required. No recycling. Dumpster screening shall comply with ATFP and installation planning standards, and DOR shall be responsible for compliance.

B. LANDSCAPING AND HARDSCAPING
1) Landscaping
   a) Lines of sight
      - Landscaping shall not obscure lines of sight. Lines of sight shall be determined by the mature growth of trees and other plantings. Provide clear lines of sight between guards and the following functions:

- Vehicle ID check guard booth guards view of vehicle and driver during the vetting process
- Overwatch position view of ID check area.
- Command and control view of ID check and search area exits.
- Landscaping shall not infringe on sight distance for drivers. Sight distance shall be as defined in the American Association of State Highway and Transportation Officials (AASHTO) Green Book

b) Make selection of landscape materials from among species well adapted to the region and shall consider maintenance requirements. Focus landscaping concepts on desirable environmental effects such as windbreaks, shade, and screening of undesirable views and definition of desirable enclosed areas.

c) The landscaping plan is to consider the irrigation requirements. The selected species are to be native and drought resistant such that a permanent irrigation system is not required.

1) Sidewalks: Provide an ample functional system of walks connecting structures, parking area(s), street(s), and other sidewalk(s) as personnel traffic demands. In addition, review paths of travel to determine a layout of sidewalks that is sufficient to meet the likely paths of travel. Slopes of all sidewalks are required to meet all requirements for ADA Accessibility Guidelines. Sidewalks are to be a minimum of 4 feet wide. Construct sidewalks of Portland Cement Concrete having a minimum 3,500 psi compressive strength and having 4-inch minimum thickness. Conformance with ABA is required.

C. SITE DESIGN REQUIREMENTS

1) Grading

a) Provide positive drainage for all areas and use existing drainage ways to the extent possible. It is desirable to direct drainage away from buildings to curb and gutter or road ditches. Avoid swales between buildings and parking areas, if possible. Grade parking areas such that stormwater is directed off to the sides, with curbs and gutters or road ditches to control drainage, and not down the center of the parking area, where possible. Balance earthwork to the extent possible without compromising the design. Keep the number of existing trees to be removed to a minimum. No grading is to be done within drip lines of existing trees to be preserved.

b) Design grading such that visual lines of sight are maintained throughout the ACP corridor between the major functional areas Gatehouse, AVBs, guard booths, vehicle search area, ID check area, etc.).

c) Comply with AASHTO Green Book for vertical roadway profiles.

2) Line of sight

Individual obstructions, to include canopy columns, shall not cause more than 11 degree interruption of line of sight of the inbound lanes (in both directions-both upstream and downstream) from vehicle ID check guard booths and other routinely occupied vehicle ID check guard locations.

3) Adjustment of existing structures

Adjust all manholes, valve boxes, or inlets of any nature within the project that do not conform to the finished grade in either surfaced or unsurfaced areas to the finished grade. Where inlets, manholes,

or valve boxes fall within a surfaced or unpaved roadway or parking, remove the existing frames and cover and replace with a heavy-duty frame and cover. Adjust the structure as needed to fit the new conditions. Provide structures of a type suitable for the intended use and conforming to the requirements of the applicable sections herein.

4) Sidewalks
Provide concrete sidewalks with a transverse grade of 2 percent. The maximum longitudinal sidewalk grade adjacent to the roadway shall be less than or equal to the adjacent roadway grade. Sidewalks without railings shall have a maximum grade not to exceed 5 percent. Sidewalks with handrails and landing shall have a maximum slope of 8.333 percent (12 horizontal to 1 vertical [12H:1V) slope with 5-foot level landings at 30-foot maximum spacing and at the top and bottom of the slope. See Uniform Federal Accessibility Standards for additional requirements.

5) Stairs
Stairs shall not be used.

6) Transverse parking grades
   a) Absolute minimum of 1.5 percent for flexible parking and 1 percent for rigid pavement.

7) Longitudinal parking area grade
Maximum of 4 percent

8) Road and street longitudinal grades
Preferred maximum longitudinal road and street grades of 5 percent. Use of longitudinal road and street grades greater than 7 percent shall not be used.

9) Pedestrian ramp grades
   a) Absolute minimum of 10 percent for short distances only.

10) Gutter grades
   a) Absolute minimum of 0.5 percent.

11) Building floor elevation
Set building finished floor elevation to ensure that the required minimum and maximum grades are met. Construct first floor of new buildings a minimum of 1 foot above the 100-year flood plain elevation, if applicable.

12) Grades away from buildings
   a) Minimum Soil Grade: 5 percent for 10 feet.
   b) Maximum Soil Grade: 10 percent for 10 feet.
   c) Sidewalk Grade: Preferred is 2 percent, maximum is 4 percent and this shall be subject to approval by the COR. This is especially important where sidewalks transition between the buildings and adjacent roadways or drives that have vehicle traffic.

13) Overlot grades
   a) Minimum 1 percent for cohesionless sandy soils.
   b) Minimum 2 percent for cohesive soils or turfed areas.
   c) Side slopes for ditches, roads, and other turfed areas shall be no steeper than 3H:1V, preferred is 4H:1V. A 10-foot-wide shelf shall be constructed every 15 feet in elevation change on all cut and fill slopes. Retaining walls are an option to limit the amount of cut and fill.

14) Ditches
Grade ditches at non-erodible slopes or line the ditch with an appropriate material to prevent erosion. Use a design storm with a return period of at least 10 years to determine erodibility of ditches and swales. Provide the depth of ditches along pavement

shoulders such that the water surface from the 10-year design storm is below pavement subbase and base courses that daylight through the adjacent shoulder.

15) Storm drainage system
Comply with the appropriate UFC requirements for design, construction, and material specified for storm drainage installation. State Department of Transportation requirements may be used with Government approval. Use reinforced concrete pipe (RCP) with watertight joints for all storm drainage lines constructed under road, parking area, and or surfaces subject to vehicular traffic. Include stormwater drainage design features to ensure removal of stormwater flow prior to the AVB location.
See Paragraph 6.0 for additional storm drainage system requirements. Be especially mindful of the pavement drainage in the area of the AVB(s). Ensure sheet and/or gutter flow toward AVBs is either captured in a storm drain system or provide pavement grading such that stormwater flow is directed away from AVBs.

16) Asphalt Pavement
Provide asphalt aprons, roads, and parking areas in accordance with project requirements. Construct the asphalt areas with concrete curb and gutter at the project specific locations.

17) Concrete Pavement
Provide concrete pavement in accordance with project specific locations. Construct the concrete pavement with the curb type at project specific locations, minimum 6 inches high.

18) Traffic signage, pavement markings, and striping
Provide traffic signage, pavement marking, and striping for all roads and parking areas. Design signage, pavement markings, and striping in accordance with Paragraph 6.0. Provide non-reflectorized paint for parking areas pavement markings. Use reflectorized paint for road and street pavement markings

19) Exterior signage
Provide exterior signage in accordance with Installation Design Guide in Appendix E.

D. MINIMUM ANTITERRORISM STANDARDS FOR ACP BUILDINGS

1) General
ACP structures must be sited, designed, and constructed in accordance with the minimum requirements of UFC 4-010-01, "DoD Minimum Antiterrorism Standards for Buildings". Facilities that are, by occupancy, considered inhabited structures, in accordance with the criteria, which cannot be sited to meet conventional construction standoff distance requirements from threats, shall be designed as hardened facilities.

2) Standoff
Shall be in accordance with UFC 4-010-01 "Minimum Antiterrorism Standards for Buildings." Standoff shall consider a moving vehicle threat scenario within the ACP corridor.
In addition to the UFC cited in this paragraph, UFC 4-020-01 "DoD Security Engineering Facilities Planning Manual"; UFC 4- 021-02 "Electronic Security Systems"; and UFC 4-021-01 "Design and O&M Mass Notification Systems" apply to the facility.

3.5 ARCHITECTURAL REQUIREMENTS

A. ARCHITECTURAL FUNCTIONAL REQUIREMENTS

1) Visitor Control Center (VCC)
The building shall be located and designed to emphasize entryways and provide clear visual identification of main entry doors from the

POV parking area as well as the commercial vehicle parking area. The building has three primary functions: 1. Pass and ID, 2. Traffic/QASAS and 3. Common or shared spaces. For both the Pass and I.D. function and Traffic/QASAS function the public areas shall be separated from the staff and private office areas via secure doors or other means.

a) Pass and I.D. (Visitor Processing) and Common Areas
- Three (3) processing positions with elevated positions when compared to Lobby.
- Lobby - to accommodate a minimum of ten (10) people.
- Space to view safety video - minimum ten (10) people (can be shared space with Traffic such as conference room).
- 1 workstation adjacent to processing positions, with standard office lockset.
- Private Office - private office adjacent to processing area.
- Break Room - can be shared with Traffic.
- Public Toilet Rooms - provide privacy locksets and fully ABA compliant.
- Staff Toilet Rooms - provide privacy locksets and fully ABA compliant.
- Janitor's Closet - provide mop sink and standard utility space lockset.
- Mechanical and electrical room: Provide entry doors with locksets (coordinate keying with installation groups responsible for maintenance and operation).
- Communications room: Provide entry doors with access control and locksets coordinate keying with installation groups responsible for maintenance and operation).

b) Commercial Truck Processing (Traffic) and QASAS
- Open Office - Four (4) modular workstations. Space for two large multifunction printers.
- Two (2) private offices with standard office locksets. Located near Open Office.
- Conference Room for fourteen (14) people located adjacent to office area. Provide locksets and access control to secure office function from public access.
- One (1) MMT/Carrier Office and with one workstation; located adjacent to Lobby. Provide gun lockers in this room. Provide locksets and access control to secure office function from public access.
- Traffic Check-In Area - provide fixed casework workstation. One (1) badge box and accommodations for multifunction printer. Connect to Lobby and provide secure separation for when office is not open.
- Two (2) workstations for UPS and FedEx located in Open Office area.
- One (1) workstation for QASAS Inspector located in Open Office area.
- Space for fifteen (15) government furnished five-drawer legal size files cabinets.

- Break Room - provide built-in upper and lower casework to accommodate large residential refrigerator, freestanding range and ABA compliant sink.
- Public Toilet rooms - shared with VCC function.
- Staff Toilet rooms - shared with VCC staff.

2) Gatehouse
Gatehouse shall be located to allow gatehouse personnel to observe and oversee the ID check area and the exits from search areas and must have a 180 degree un-obstructed view. Through VSS, the personnel in the gatehouse can monitor the entire operation of the ACP. A control panel for the AVB shall be located in the command and control section of the building. The gatehouse needs to be located behind a 6-inch minimum curb, past the ID check canopy. Due to the function of the building, the public will not be allowed entrance to the building; therefore, the facility will not be required to be ABA or ADA compliant. The building shall contain a command and control function, latrine, inside storage, mechanical and electrical room, and communications room. The command and control functional area shall be protected with bullet resistant construction. The roof requires ballistic rating only where direct arms fire threat is possible from an elevated position.
   a) Command and control function: Provide ballistic resistant walls, openings, windows and exterior doors, door frames, access control and hardware (lockset) assemblies (coordinate keying with installation groups responsible for maintenance and operation).
   b) Latrine: Provide privacy lockset.
   c) Inside storage: Provide standard utility space lockset.
   d) Mechanical and electrical room: Provide entry doors with locksets (coordinate keying with installation groups responsible for maintenance and operation).
   e) Communications room: Provide entry doors with locksets coordinate keying with installation groups responsible for maintenance and operation).

3) ID Check and Truck Seach Area Canopies
The ID check canopy shall be a metal framed roof structure supported by columns that cover the islands and entry lanes of the ID check area. It is required to clad the structural members and provide soffits to the underside of the structure to prevent birds from nesting on the exposed legs of the steel beam flanges. The roof of the canopy can be in any configuration (gable, hipped, low-sloped, single sloped, or curved) and shall be in accordance with the drawings included in Appendix A and Paragraph 6.0.

4) Guard Booths
Provide ballistic rated construction. Booths may be pre-manufactured unit or stick built. Provide 360-degree field of view. Provide sliding ballistic rated doors, door frames, and hardware assembly. Window glazing, frames, and wall sections must be ballistic rated. Provide 32-inch-deep stainless steel countertop. Roof requires ballistic rating only where direct arms fire threat is possible from an elevated position.

5) Overwatch Booth
Provide ballistic rated construction. Booth may be pre-manufactured unit or stick built. Provide 360-degree field of view. Provide

ballistic rated door, door frames, and hardware assembly. Window glazing, frames, and wall sections must be ballistic rated. Provide ballistic rated gun ports on all four sides. Provide stainless steel countertop. Roof requires ballistic rating only where direct arms fire threat is possible from an elevated position.

3.5.1 FINISHES AND INTERIOR SPECIALTIES

A. GENERAL

1) The overall architectural goal is to provide a functional, quality, visually appealing facility that is a source of pride for the Installation and delivered within the available budget and schedule. Design building to enhance or complement the visual environment of the Installation. Where appropriate, reflect a human scale to the facility. When practical, exterior elements, roof forms, and detailing shall be compatible with the surrounding development and adjacent buildings on the Installation and follow locally established architectural themes. Use durable materials that are easy to maintain. Provide an exterior appearance and massing that is consistent with the Installation's design guidelines.
2) Interior building appearance: Provide the facility interior with a warm, comfortable, and professional environment through the appropriate use of building materials, finishes, fabrics, color, and textures. Provide materials of high quality, functional, easily maintained, and furnished as described herein. The design will incorporate quality and long-lasting finishes that are easy to maintain and balance functionality with aesthetics. Provide complementary building finishes and details. Finish and fabrics shall provide a completely integrated interior design. Coordinate the interior building appearance with the exterior building appearance. Provide low maintenance, easily cleaned room finishes that are commercially standard for the facility occupancy specified, unless noted otherwise. The Interior Design and finishes shall comply with Unified Facilities Criteria (UFC) Interior Design UFC 3-120-10 and Army Access Control Points (ACPs) Standard Design. Products and finishes with sustainable attributes shall take precedence and follow UFC 1-200-02.
3) Interior design categories: Interior design is divided into two categories; structural interior design (SID) and FF&E. SID is the design of building related interior finishes and includes the selection and specification of interior and exterior materials, and finishes for the building environment. Items typically considered a part of the building design include but are not limited to: exterior and interior building materials, floor, wall and ceiling finishes, built-in casework, millwork, fixed equipment, trim item, signage, and window treatments. SID Building related items are those materials and finishes that are generally applied or fastened to the building. Furniture related interior design(FF&E)is the design of the interior furniture and includes the selection and specification of these items. Items typically considered part of the FF&E furniture package include but are not limited to: workstations, seating, tables, storage units, and trash receptacles. Provide Basis of Design for appropriate furniture finishes and fabrics for the intended use. Provide Basis of Design upholstery fabric (color, pattern, and fiber content) that is easily cleaned and helps hide soiling. Patterned or multi-colored fabrics are recommended for seating in public spaces. All FF&E shall comply with Army Access Control Points (ACP) Standard Design requirements.

B. FINISHES

The following includes functional requirements. Any reference to Installation criteria is to establish materials and finishes consistent with the Installation's architectural theme.

1) Visitor Control Center (VCC)

a) General: Materials and assemblies shall be selected for durability, low maintenance, and long life.

b) Exterior Doors: Frames shall be welded steel frames. Doors shall be solid core steel doors. All exterior doors shall meet the required ballistic rating and ATFP requirements. Exterior doors shall meet UFC 4-010-01.

c) Interior Doors: Frames shall be welded steel frames. Doors will be solid core wood with stained finish. Overhead aluminum rolling counter doors are proposed for the countertops at both Processing-106 and Traffic Check-In-111.

d) Windows: Fixed aluminum units to meet applicable energy requirements and ATFP requirements. Exterior windows shall meet UFC 4-010-01 with laminated glazing and glazing attachment requirements.

e) Hardware: Locksets and access control devices shall be specified for doors in accordance with user requirements.

f) Special Construction: Tornado Shelter - a tornado shelter shall be constructed to meet ICC-500 requirements, including an ICC 500 compliant door and door hardware.

g) Exterior Wall Assembly/Thermal Envelope: shall meet all applicable energy code requirements, ballistic requirements, and Pine Bluff Arsenal Installation Planning Standards.

h) Exterior Finishes: prefinished steel soffit, gutters, downspouts, and standing seam metal roofing.

2) Gatehouse

a) General: Materials and assemblies shall be selected for durability, low maintenance, and long life. Ballistic Requirements - this building will be constructed to meet all minimum ballistic requirements as defined by Army ACP Standard.

b) Command and control Function: Provide ground and polished concrete for the floor finish, resilient base for the wall and floor trim. Provide painted wallboard for the wall finish with protective wallcovering wainscot and corner guards on outside corners. Provide suspended acoustical tile with recessed light fixtures and hold down clips for the ceiling. Provide 8-foot minimum ceiling heights above the finished floor. Provide a raised section of the ceiling in front of the front wall for the installation of VSS monitors that place the monitor out of the line of sight of a person looking out the windows. Provide solid surface material for countertops and window sills. Provide ballistic rated roof and ceilings at locations where a direct fire threat is possible from an elevated position.

c) Latrine: Provide ground and polished concrete for the floor finish, resilient base for the wall/ floor trim. Provide painted wallboard for the wall finish. Provide painted wallboard ceiling with recessed light fixtures. Provide 8-foot minimum ceiling heights above the finished floor.

d) Inside storage: Provide ground and polished concrete for the floor finish, resilient base for the wall and floor trim. Provide painted wallboard for the wall finish. Provide painted wallboard ceiling with recessed light fixtures. Provide 8-foot

minimum ceiling heights above the finished floor. Provide mop sink and mop holder with shelf.

e) Mechanical and electrical room: Provide ground and polished concrete for the floor finish. Resilient base for wall/ floor trim. Provide painted wallboard for the wall finish. Provide rigid gypsum wallboard ceiling with recessed light fixtures. Provided suspended light fixtures.

f) Communications room: Provide ground and polished concrete for the floor finish. Resilient base for wall and floor trim. Walls shall be integrally colored concrete masonry or wallboard. Provided suspended light fixtures.

g) Exterior Doors: Frames shall be welded steel frames. Doors shall be solid core steel doors. All exterior doors to meet UFC 4-010-01 and minimum ballistic rating.

h) Interior Doors: Frames shall be welded steel frames. Doors will be solid core wood with stained finish.

i) Windows: Fixed aluminum units to meet applicable energy requirements. Windows and glazing shall meet UFC 4-010-01 and minimum ballistic rating.

j) Hardware: Locksets and access control devices shall be specified for doors in accordance with user requirements.

k) Exterior Wall Assembly/Thermal Envelope shall meet all applicable energy code requirements, ballistic requirements, and Pine Bluff Arsenal Installation Planning Standards.

l) Exterior Finishes: prefinished steel soffit, gutters, downspouts, and standing seam metal roofing.

3) ID Check Canopy and Truck Search Canopy

a) General: prefinished steel soffit, gutters, downspouts, and standing seam metal roofing. Painted structural steel framing.

4) Guard Booth and Overwatch Booth

a) Pre-manufactured booth or stick built construction with 3-foot by 3-foot anti-fatigue mat. Walls may be painted ballistic resistant wall panels. Inside ceiling height shall be, as a minimum, 7 feet and 2 inches above finish floor.

C. INTERIOR FINISH REQUIREMENTS

a. Refer to Unified Facilities Criteria (UFC) Interior Design UFC 3-120-10 and Army Access Control Points (ACPs) Standard Design for performance requirements. Products and finishes with sustainable attributes shall take precedence and follow UFC 1-200-02.

D. INTERIOR SPECIALTIES

1) Signage: Provide a complete interior signage system that coordinates with the interior design. The facility interior signage system shall be standardized throughout the building and shall be flexible to allow for the addition and deletion of signs and information. Room signs shall be provided. Room signs for spaces in which the room name, function of the room, or personnel within a room may change shall have a changeable paper insert that can be changed by the user. Provide rooms signs where appropriate. See Section 5.4.6.4 Signage.

2) Window treatment: Provide commercial grade horizontal blinds for exterior windows with the exception of functions that required visibility (that is, guard booth).

3.6 STRUCTURAL REQUIREMENTS

A. GENERAL

Structural design of all access control buildings is governed by the modified by UFC 3-301-01, "Structural Engineering", International Building Code (IBC), ASCE 7, and the applicable industry codes for the particular material(s) involved. The most current edition of UFC 3-301-01 applies, and the applicable edition of IBC is identified in the UFC.

B. LOADINGS

The structural design must include all applicable vertical and lateral loading, including Dead, Live temporary and erection loads, rain, snow, ice wind, seismic, thermal difference and differential settlement in accordance with the IBC, and, by reference, American Society of Civil Engineers (ASCE) publication, ASCE 7, load combinations must be in accordance with ASCE 7.

The structural design must ensure the lateral stability of the structures and foundations and must ensure that the vertical and lateral loads are transferred from their point of application through the structural framing, bracing, secondary members, foundations and to the soil.

The structural design must consider the effects of deflection, settlement, and thermal movements. Member deflection and structure side-sway must not exceed the limits required by UFC 3-301-01.

C. SEISMIC DESIGN

Seismic design of buildings shall be in accordance with ASCE 7, except as modified by UFC 3-301-01.

D. BALLISTIC RESISTANT DESIGN

Facility buildings identified in the Architectural criteria as ballistic resistant must be designed in accordance with the provisions of UFC 4-023-07, "Design to Resist Direct Fire Weapons Effects", in addition to the criteria identified in the architectural design narrative.

E. ANTITERRORISM DESIGN

ACP structures must be sited, designed, and constructed in accordance with the minimum requirements of UFC 4-010-01, "DoD Minimum Antiterrorism Standards for Buildings", unless a higher level of protection is mandated by local threat assessment and/or policy. Facilities which cannot be sited to meet conventional construction standoff distance requirements from threats, must be designed as hardened facilities. Hardened structures must have walls, roof slabs, doors, and windows designed and/or specified to resist blast pressures associated with the actual threat standoff distance in accordance with UFC 4-010-01.

F. CANOPIES

1) Wind loading

Vehicle canopies must be considered as open structures with clear wind flow for calculation of wind pressures on roofs for main wind force resisting systems and component and cladding wind pressures in accordance with the UFC referenced edition of ASCE 7. Canopies shall be considered flexible structures, having a Gust Effect Factor (G) of not less than 0.90, in accordance with ASCE 7, to account for flexibility of the building system. Canopy wind for the design of frames or columns must include the summation of pressures on the various canopy elements having a projected area perpendicular to the wind direction under consideration. Projected areas include front and rear surfaces of both windward and leeward canopy fascias or other vertical roof structure surfaces, windward surfaces of all

columns, and lateral components of wind on sloped roofs, in accordance with ASCE 7. Canopy fascias must be considered as either Mono slopes or solid freestanding signs, in accordance with ASCE 7, depending on their configuration. Wind pressure on columns must be computed as for open signs, and shall be applied to all free-standing columns simultaneously, rather than just to the windward facing perimeter columns. Main wind force resisting system overall lateral wind forces from the roof, fascias, and columns must be applied in each (+/-) direction along the principal building axes as separate loading conditions, Wind shall be considered at 75 percent of the full pressure from additive orthogonal axis directions applied simultaneously (representing oblique wind directions).

2) Lateral force resisting system
Canopies must have a rigid frame lateral force resisting structural system. Lateral forces must be transferred to columns and frames by horizontally spanning spandrel members, structural (Flexible) diaphragms, or horizontal bracing systems in the plane of the roof. The metal roof panels and liners must not be used as a structural diaphragm unless calculations in accordance with the provisions of the Steel Deck Institute (SDI), demonstrating the adequacy of the strength and stiffness of the panels and anchorage system, Roof and liner panels must be anchored to purlins or other framing members with screws. Clamp systems are prohibited for attaching panels to the structure.
   a) Column anchorage and foundations
      Canopy column base anchorages must be designed for combined shear, moment, and uplift, as applicable, in accordance with the UFC referenced edition of American Concrete Institute (ACI) code ACI 318 Chapter 17. Canopy foundations must be designed to resist factored wind uplift and overturning. Soil bearing pressures shall be investigated for all loading conditions, including overturning.

3.7 THERMAL PERFORMANCE

All building construction and thermal envelopes shall conform to applicable criteria, testing, and commissioning.

3.8 PLUMBING REQUIREMENTS

See Paragraph 5.0 and Paragraph 6.0 for plumbing requirements. Plumbing system energy usage and equipment shall comply with UFC 1-200-02 and the International Plumbing Code 2024 fixture performance requirements

3.9 COMMUNICATIONS AND SECURITY SYSTEMS

A. COMMUNICATION
   1) Communication system shall be installed in accordance with the Technical Guide for Installation Information Infrastructure Architecture (I3A).
   2) Command and control, ID check guard booth, and search area, shall have a minimum of two means of communication from the facility and, when present, the central security monitoring station.
   3) All wiring shall be installed in an approved electrical raceway system
      a) Exterior direct buried wiring are not allowed. All wiring shall be in conduit and shall be concrete encased

B. INFORMATION CONNECTIVITY

1) Information connectivity and LAN systems shall be installed in accordance with the Technical Guide for Installation Information Infrastructure Architecture (I3A).
2) Command and control and ID check guard booth shall have information connectivity to the LAN system and internet.

C. VIDEO SURVEILLANCE SYSTEM (VSS)

1) Furnish and install the conduit pathways, junction/pull boxes, poles/posts, and primary electrical power to support the complete VSS. The VSS equipment will be GFGI.
2) Overwatch cameras. VSS cameras shall over watch the approach zone, ID check area, search area, and AVB area. Camera view at the AVBs shall include the non-secure side of the outbound AVBs as well as any traffic signals facing toward the non-secure side. Camera view at the AVBs shall include a view of the secure side of all AVB(s) and the non-secure side of the inbound AVBs, and traffic signal. If the in-bound and out-bound lanes are separated by a median, then have an extra camera that sees the non-secure side of the outbound AVBs.
3) ID check area. VSS cameras shall be positioned to view drivers, ID check guards, rear license plate, and the vehicle in the ID check lane. This includes the driver's face and the driver's interaction with ID check guards.
4) Search area. VSS cameras shall be positioned to view drivers, Search guards, rear license plate, and the vehicle being searched.
5) Rear license plates. Conduit shall be installed in the islands at the search areas and ID check area to accommodate future cameras to view rear license plates. Coordinate with the requirements given in Paragraph 3.9.E. Installations that will receive AIE do not need an additional rear license plate camera for the ID check area, because there will be one that is part of the AIE install package.
6) Cameras. All cameras are intended to be fixed view except for the ID check area and search area overwatch cameras are allowed to be pan/tilt/zoom. The AVB area cameras are to be fixed to ensure the proper views are always maintained. Cameras shall be mounted in a manner to eliminate and prevent vibrations due to wind and other causes.
7) Monitors. Monitors for VSS shall be at the command and control location and the central security monitoring station.
8) Network video recording. The VSS shall include network video recording for all ACP video cameras.

D. ELECTRONIC SECURITY

1) Duress alarms. Guards at the ID check area guard booth, search area, and overwatch position shall have duress alarm capability that shall annunciate at both the command and control location and the central security monitoring station, when available.
    a) Furnish and install the conduit pathways, junction/pull boxes, device mounting boxes, and primary electrical power to support the complete Duress system. The Duress system equipment will be GFGI.
    b) Duress buttons shall be protected and not prone to accidental activation.
    c) Duress buttons shall be located within proximity to all routinely manned positions.
    d) Duress button shall not be visible to the general public.
    e) Telephone shall not be considered a duress device in their normal configuration.

f) If there is not a central monitoring station, then annunciate at an alternate security force station or monitoring location.

2) Intrusion detection. Exterior doors to gatehouse and guard booths shall be equipped with balanced magnetic switches for intrusion detection. Storage rooms that do not contain any security, VSS or Communication equipment are not required to have balanced magnetic switches. Interior doors that go to rooms that contain Communication or security equipment shall be equipped with balanced magnetic switches.

3) Tamper switches

a) Electronic control cabinets for communications, AIE, VSS, and security controls shall be equipped with tamper switches. VSS and security controllers shall be in cabinets.

b) AVB cabinets shall be equipped with tamper switches. AVB controllers shall be in cabinets. Control panels associated with the AVB controls (master, guard booth, local, etc.) are required to be equipped with tamper switches. Tamper switches that are required to be on each operating panel, cabinet, and handhole shall be monitored by the AVB control system and installed as part of the AVB control system. Visual indicating alarms are to be located at the AVB master control panel. The AVB control system shall provide one output to the IDS panelboard.

c) The junction box at the overwatch position pad shall be equipped with a tamper switch.

d) Manholes and handholes that will contain duress alarm, AIE, VSS, intrusion detection, or AVB control wiring and there are splices present are to have tamper switches provided on the covers.

e) UPS cabinets shall be equipped with tamper switches.

E. AUTOMATION

1) Infrastructure to include the conduit pathways and space in facilities for AIE in accordance with the latest requirements by PM-PFS and the requirements in this document shall be provided.

a) AIE includes a rear license plate camera, a driver face camera, traffic arm with signal, and a card reader that is located on each ID check area island.

b) AIE includes equipment that is provided in each ID check area guard booth that monitors the camera views and the card reader.

c) AIE head end equipment is located in the communications room and is to be in a cabinet.

2) Automation equipment other than AIE may be required. Provide infrastructure to include the conduit pathways, junction/pull boxes, cable, primary electrical power, and space for this equipment.

F. ACP CONTROL SYSTEM

1) Each ACP shall be furnished with an ACP control system. The ACP control system shall be an integrated system and shall include part or all of the following subsystems. Subsystems include AVBs, AVB control system, traffic signals, traffic signal controls, traffic warning signals, traffic signs and pavement markings, traffic arms, vehicle wrong-way detectors, vehicle presence detectors, intrusion detection system, duress alarms, alarm audible and visual display notification, alarm panel(s), sequence of events recorder, VSS, data transmission, and all interconnecting conduit and wiring.

2) The ACP control system must use components and software that are intended for use in industrial or commercial control systems.

3) The latest version of Unified Facilities Guide Specifications (UFGS) 34 75 13.13 "Crash Rated Active Vehicle Barriers And Controls" shall be used.
4) Overspeed detection, when required, shall be located to ensure the overspeed zone or zones are covered to ensure threat vehicle detection. Overspeed detectors are allowed to be several different types per UFGS 34 75 13.13 "Crash Rated Active Vehicle Barriers And Controls"; however, local weather conditions and topology requirements shall be taken into account. When overspeed detection is required, judicious use is required to prevent nuisance alarms associated with having set-points too low for the traffic flow. Set-points need to be sufficiently high over the posted speed to prevent nuisance alarms. Note that some installation will have posted speeds below 25 mph; however, set-points should still be set based on an assumed posted speed of at least 25 mph in order to limit nuisance alarms. Where overspeed detection settings of less than 30mph are utilized, the zone shall not extend more than 75 feet forward (toward the approach zone) when measured from the centerline of the ID Check guard booth. Such zones must utilize equipment that allows absolute cutoff at the 75 feet (or shorter) distance and will not utilize alarm settings lower than 25mph. Where possible, use 35mph as a minimum alarm setpoint for overspeed detection systems. Wrong-way detection shall be located to ensure that a vehicle that has not been cleared to proceed and try to use the outbound lane(s) to gain entry is detected.
5) Wrong-way detectors are allowed to be several different types in accordance with UFGS 34 75 13.13 "Crash Rated Active Vehicle Barriers And Controls"; however, local weather conditions and topology requirements shall be taken into account. Wrong-way detection shall be located to ensure that rejected vehicles and other vehicles do not cause a nuisance alarm by traversing the in-bound and out-bound lanes.
6) ACP control system shall be implemented in accordance with referenced UFGS 34 75 13.13 "Crash Rated Active Vehicle Barriers And Controls".

G. ACTIVE VEHICLE BARRIER CONTROL SYSTEM

The AVB control system shall collect alarm, status, and control sensor inputs at the ACP and provide control signals to the AVBs, traffic signals, traffic arms (when present), barrier lights, in roadway lights, and warning beacons. The AVB control system shall provide alarm, status, and control information to the command and control console, each guard booth control panel, the Overwatch position control panel, the local control panel(s) at each AVB, search area control panel, the VSS for controlling camera presets, the duress alarm subsystem for controlling camera presets, and to the Installation's central security monitoring system for annunciating alarms at both the central security monitoring system alarm monitoring point and a central security monitoring system provided annunciation panel at the gatehouse.

1) Locations that do not have a central security monitoring system shall have the alarms annunciate at the equivalent location.
2) VSS and duress alarm subsystems will not be present when the AVB control system is installed. The AVB control system shall be provided with the necessary spare capacity for later installation.
3) The ACP control system must use components and software that are intended for use in industrial or commercial control systems. The

ACP control system shall not be a general purpose computer or personal computer and shall not be consumer grade software.

4) Emergency-Fast-Operate (EFO), when required by the safety scheme, shall ensure the AVB closes in 2 seconds or less.
5) Only guards in the command and control, ID check guard booths, search area, and overwatch position are required to have EFO close control of the active barriers. A master EFO button or switch shall be provided on a barrier master control panel located in command and control. Slave EFO buttons shall be located in each ID check guard booth, search area, and the overwatch position. The EFO buttons will close all active barriers in all inbound and outbound lanes that are in EFO mode, simultaneously. Only those safety schemes that require an EFO have to comply with this requirement.
6) Command and control, guard booths, search areas, and overwatch position shall have an enunciator providing audible and visual indication of alarms including over speed and wrong way.
7) Command and control and the overwatch position shall have an enunciator providing audible and visual indication of duress alarm.
8) Switches and indicating lights shall be provided on the AVB master control panel to allow the command and control guard to individually enable or disable the slave EFO buttons.
9) Switches and indicating lights shall be provided on the AVB master control panel to allow the command and control guard to individually open and close the AVBs.
10) Switches and indicating lights shall be provided on the AVB local control panel to allow maintenance personnel to individually open and close the AVBs.
11) Installation shall maintain strict key control to ensure the EFO reset and the test and local modes are only operated when allowed by the head of the guards at that ACP.
12) See ACP standard drawing set for information on panel layouts and operation.
13) See UFGS 34 75 13.13 "Crash Rated Active Vehicle Barriers And Controls", Appendix A for the appropriate Surface Deployment and Distribution Command Transportation Engineering Agency (SDDC-TEA) safety scheme and description on controls.
14) AVB and in roadway lighting:
    a) Active vehicle red delineation lighting are required to make barriers clearly visible when deployed, unless vehicle barriers are behind closed gates or the specific vehicle barriers are used to close service drives. Red delineation lighting requires LED lights, and each luminaire is required to provide a sustained illumination level of 50 lumina at a distance of 30 feet. AVBs shall include red flashing lights facing the direction of the threat vehicle. Required red lighting is dependent on the type of system required as listed in the following:
        - Bollard systems. Include, as a minimum, one red light per bollard.
        - Plate barriers systems, 3 feet or greater in width. Include, as a minimum, three red lights with one mounted within 1 foot of each barrier edge and one mounted within 1 foot of the barrier centerline.
        - Plate barrier systems less than 3 feet in width. Include, as a minimum, one red light mounted within 1 foot of the barrier centerline.

- Crash barrier systems. Include as a minimum, three red lights with one light mounted within 2 feet of each edge of the driving surface and one light mounted within 1 foot of the center of each lane spanned by the barrier.
- Net type barrier systems. No light is required to be mounted on this barrier type system, but mitigation (for example, in roadway lighting) must be provided.

b) In roadway lighting. In roadway lighting is required by certain SDDC-TEA approved safety schemes in addition to any requirements associated with the AVB delineation lighting

- Provide red non-flashing roadway lighting in the pavement on both sides of the barrier, with a minimum of three lights per lane per side. Luminaires shall have a sustained illumination level of 500,000 candela per square meter using the 10 degree refractor option at a distance of 30 feet.
- Luminaire shall be rated for vehicular traffic and shall be manufactured for use in roadways.
- Luminaire shall be unidirectional with a wide distribution pattern.
- The luminaire shall not extend more than 0.5 inch above the road surface and shall have a smooth transition from the road surface.
- In areas with snow, the luminaire shall be rated to handle snow plows.
- Luminaire housing is to be stainless steel, be corrosion resistant, or be coated with an appropriate durable coating for use in roadways.

c) AVB markings and finishes
AVBs include retro-reflective material that is visible on both sides of the barrier when deployed. The markings and finishes are to comply with SDDCTEA Pamphlet 55-15 and MUTCD.

15) Guard booths. Provide a number on the exterior of each guard booth that is visible from command and control. The number will correspond with the guard booth number used on the master control panel for the barrier controls. Numbering shall be approved by the Installation. Numbering shall be at least 6 inches high.

H. CABLE TELEVISION

1) Provide cable television in those facilities requested by the Installation.

I. GENERAL REQUIREMENTS

1) Exterior wiring. Direct buried wiring is not allowed. All wiring shall be in conduit and shall be encased in concrete. Exterior communication shall meet the requirements of I3A Technical Criteria for the Installation Information Infrastructure Architecture.
2) Signal system handhole. Provide a signal system handhole in each island/median in the ID check area. Conduit shall be run from the handhole to the island median guard booth and to the next island/median handhole. This handhole/conduit system shall be used for all signal systems (VSS, IDS, Duress, AIE, and AVB controls) to the ID check guard booths and to the area. The handhole cover is to be flush with the island/median.
3) Command and control room/area requires several systems to be installed

3.10 ELECTRICAL REQUIREMENTS

A. EXTERIOR LIGHTING

1) Exterior lighting shall comply with the lighting requirements in UFC 3-530-01 "Interior and Exterior Lighting Systems and Controls". All luminaires shall be solid-state LED type.
2) ACP corridor lighting performance requirements:
    a) Approach zone roadway(s) are to have 3 Foot-candles (FC) average maintained with an average to minimum ratio not to exceed 4:1 as measured at an elevation of 6 inches above the roadway surface. U0 and Glor GO rated luminaires to reduce glare for approaching drivers and for security personnel. Increase light level at Approach zone to provide transition to the higher level of the access control point. G2 rated for roadway or area luminaires.
    b) Access control zone, ID check area, and search area(s) are to have 5 FC average maintained with an average to minimum ratio not to exceed 3:1 as measured at an elevation of 6 inches above the roadway surface. In addition, where ID checks or searches are made, the illumination shall be 10 FC or twice the illumination in the immediate or surrounding area, whichever is greater. The vertical illumination shall be at least 25 percent of the horizontal illumination. Glor GO rated light fixtures to reduce glare. G2 rated for roadway or area luminaires.
    c) Response zone roadway(s) are to have 3 FC average maintained with an average to minimum ratio not to exceed 4:1 as measured at an elevation of 6 inches above the roadway surface. U0 and Glor GO rated light fixtures to reduce glare for approaching drivers and for security personnel. Increase light level at Response zone to prevent glare to occupant of overwatch position. Provide shielding toward the overwatch position. G2 rated for roadway or area luminaires.
    d) The ACP corridor (approach, access control, and response zones) cannot have poles shorter than 15 feet. In situations where poles would need to be shorter to provide the lighting, then the COS is to be contacted. A proposed solution is required to be approved by SDDC-TEA to ensure all aspects of motorist safety is maintained.
    e) ACP layouts will vary greatly, which will have an effect on the length of the approach, access control, and response zones. Situations where the zone length is too short to have sufficient transitional lighting will be taken on a case by case basis. Approval will be by the COS with consultation with SDDC-TEA to ensure traffic safety is maintained. This may mean on a short approach zone that it may be deemed better to have the appropriate transition lighting over having the full FC level average immediately at the start of the ACP.
3) Color rendering index (CRI): All light sources shall have a CRI of not less than 70.
4) Correlated color temperature (CCT): All light sources shall not be more than 3000K.
5) Transition lighting. Transition lighting shall be provided in accordance with UFC-3-530-01 "Interior and Exterior Lighting Systems and Controls", SDDC-TEA Pamphlet 55-15, and IES Handbook of North America. Transition lighting goes from the lower light levels prior to the approach zone up to the required light level for the approach

zone and then again up to the required level for the access control zone. Then the lighting will transition from the access control zone to the lower level for the response zone. Then after the AVBs, the light level needs to transition down to the lower light level for the street. Roadway geometry may impact the ability to do the transition lighting in accordance with the criteria; however, the best engineering attempt shall be accomplished.

6) Existing ACPs where roadways within the ACP are revised in width or geometry are required to bring that entire ACP zone into compliance with the lighting levels. If adjoining ACP zone(s) are not in compliance, then transitioning lighting is required from the upgraded zone to the existing zones.
7) Square poles are not permitted. Exterior lighting poles and the electrical connections shall be frangible when required by MUTCD.
8) Poles are to be located at least 2 feet from any road edge or curb face. Comply with AASHTO Roadside Design Guide break-away requirements.
9) Command and control shall be provided with Hand/Off/Automatic controller(s) with the automatic means consisting of a photocell, time clock, or both for controlling the approach zone, access control zone, and response zone, unless the customer approves in writing an alternate location. In addition to the means to control the canopy lighting from the command and control, provide a means to turn on or off the lights at the canopy.
10) Exterior doors are to have a luminaire above or adjacent to the door that can be controlled via an automatic means such as a photocell or a manual means. The following facilities are exempt from this requirement: ID check guard booth and overwatch building.
11) Provide an open and close visual indicator on the ID check canopy over each lane that is controlled from the ID check area or command and control. The preferred style of indicator is the red X and green arrow, but other types are allowed if approved in writing by the local Installation and the COS-ACP.
12) Provide lighting for all entrance signs and flag poles unless requested otherwise by the Installation.
13) Pole mounted luminaires are to be provided with surge protection as well as the power panelboard that powers the luminaires. Each luminaire shall be provided with a means to add controllability in the future without changing out the luminaire

B. INTERIOR LIGHTING

1) Interior lighting shall comply with UFC 3-530-01 "Interior and Exterior Lighting Systems and Controls" and with the sustainability requirements. All luminaires are to be solid-state LED type and equipped with 0-10V dimming drivers.
2) For areas not listed in UFC 3-530-01, lighting for these spaces with suspended acoustic ceilings shall be of the recessed type. Where ceilings are not provided, provide pendant or wall mounted luminaires.
3) Lighting in command and control and ID check guard booth shall be dimmable.
4) Emergency and exit lighting: Selected emergency lighting and exit lighting located along the egress pathways, including exterior building mounted located at exit discharge doors, shall be provided and installed in accordance with National Fire Protection Association (NFPA) 101, UFC 3-600-01 "Fire Protection Engineering Facilities", UFC 3-530-01 "Interior and Exterior Lighting Systems and Controls", and UFC 4-010-01 "DoD Minimum Antiterrorism Standards

for Buildings". Emergency and exit access lighting are to be on battery backup.

5) Although a stand-by natural gas generator is provided as alternate back-up power source for the site, the emergency and exit lights shall also have integral battery back-up power. The integral battery back-up power is considered the primary source. All signage as required by life safety codes are to be included in designs.
6) Interior luminaires shall be provided with surge protection as well as the power panelboard that powers the luminaires.

C. GENERAL POWER REQUIREMENTS

1) HVAC/Plumbing system: Provide dedicated electrical panelboard(s)for the system. Provide electrical power connections, including overcurrent protective devices, controllers, and associated branch circuits. All associated electrical devices shall be coordinated with manufacturers.
2) Other equipment and systems. See discussion on Communications and Security Systems for other equipment and systems that require power. Provide power for communications equipment in accordance with I3A Technical Criteria for the Installation Information Infrastructure Architecture.
3) A dedicated panelboard shall be provided withinCommroomin accordance withUFC 3-580-01, paragraph 2-4.3.2. Fire Alarm/Fire Protection equipment power circuits must be providedin accordance withUFC 3-520-01, paragraph 3-2.7.
4) The power panelboard shall not be installed below a counter; this includes pre-fabricated structures such as the ID check area guard booths. A dedicated single point of connection shall be routed to these pre-fabricated structures. Contractor shall coordinate with pre-fabricated structures manufacturer for final power connection requirements.
5) Exterior wiring and raceways: Direct buried wiring is not permitted. For underground installations wiring shall be in PVC conduit. For above-ground installations, wiring shall be rigid steel conduits. All 600 volt or less wiring must be insulated THWN-2. If the conduit is within 8 feet of a roadway, then the conduit shall be concrete encased or in rigid steel conduits. All wiring over 600 volts shall be concrete encased.
6) Provide power receptacles in accordance with NFPA 70 and in conjunction with the proposed equipment and furniture layouts. Provide duplex receptacles adjacent (at least 6 inches away) to each telecommunication outlet. Special receptacles may be required for equipment to be installed by others to include package scanners. The following are in addition to the general requirements.
    a) ID check guard booth: Provide one duplex receptacle at the counter that is either on a UPS circuit or provide a standalone UPS.
    b) ID check guard booth: Provide an exterior receptacle on each of the narrow ends. Provide at least one receptacle below the eave along each of the long sides.
    c) Overwatch pad: Provide a duplex receptacle at the pad.
    d) ID check canopy: Provide at least one duplex receptacle per island.
    e) Passenger vehicle search area canopy: Provide at least one duplex receptacle on a column on each side of the inspection space. Provide a dedicated circuit for each side of the inspection space receptacles.

f) ID check canopy, passenger vehicle search area canopy: Provide one additional receptacle at ID check for fans. Provide dedicated 20 amp, single pole circuit.
g) Command and control: Provide receptacles above and below the counter. Provide grommets in the counter for power and other cords.
h) Entry gates that cover two lanes or greater shall be electric instead of manual.

7) Electrical Service: Contractor must provide and connect the primary Medium Voltage service feeder from overhead and transition to underground service lateral. Provide primary Medium Voltage feeder and connect to Service Transformer serving the ACP. Design, furnish and install the primary and secondary service laterals in accordance with UFC 3-550-01, Exterior Electrical Power Distribution System.
8) Power handhole: Contractor must provide a power handhole in each island/median in the ID check area. Conduit(s) shall be run from the handhole to the island/median guard booth and to the next island/median handhole. This handhole/conduit system shall be used for all 600 volt or less power to the ID check guard booths and to the area. The handhole cover is to be flush with the island/median. Handholes shall provide in compliance to UFC 3-550-01.
9) Service transformer. Contractor must design, furnish, and install the service transformer, including concrete pad, in accordance with UFC 3-550-01, 3-5 Pad-mounted Distribution Transformers. The service transformer shall be located within the ACP corridor (inside the passive barrier) or on the outside. Location needs to ensure access to the transformer is maintained for performing maintenance. If on the outside, this may include a manual gate with the appropriate crash rating in the passive barrier. If located by buildings, ensure transformer location comply with UFC 3-600-01, Table 4-4 Separation Distance Between Outdoor Insulated Transformer Containment and Buildings. Also, ensure the transformer is located at least 6-feet away from building main entrance per Army ACP Standard design. Provide and install grounding ring around the transformer
10) Panelboards and other cabinets: Panelboards and other cabinets that are located in the ID check area or in search areas cannot be located closer than 18 inches to the curb face. Locations where the equipment may be struck by an errant vehicle are to provide bollards for protection.

D. BACK-UP POWER

1) Generator
a) Standby power to the ACP shall be natural gas generator that is permanently connected to an automatic transfer switch (ATS). In addition, provide a portable generator hard-wired connection or a docking station to support the mobile generator connection. Portable generator connection point shall be located at a suitable location, and access for trailer mounted portable generator.
b) Start-up of the generator and transfer between standby and normal power shall be performed automatically within 10 seconds after the normal source of electrical power fails.
c) The status monitored at the command and control center shall include position of automatic transfer switch and alarms for loss of normal power, generator malfunction, and low fuel.
d) The location for connection of the on-site generator is to be either within the ACP corridor (inside the passive barrier) or on

the outside. Location needs to ensure access is maintained for delivering or removing the generator, adding fuel, and performing maintenance. If on the outside, this may include a manual gate with the appropriate crash rating in the passive barrier.

e) At minimum, the following loads shall be on generator power:
- Interior lighting for command and control, the gatehouse, and guard booths
- Canopy lighting in the ID check area and the search areas.
- External lighting in the access control area.
- External lighting in the search areas this shall include 100 feet on both sides of the search canopy.
- Approach zone and response zone lighting within 100 feet of the access control zone.
- External lighting 150 feet on both sides of the final vehicle barriers.
- ID check area traffic arms.
- Search area(s) traffic arms.
- AVB - see Paragraph 3.10.D.2 UPS.
- **UPS.**

2) UPS

The ACP shall have one or more UPS to power critical security, communications, and safety loads when the normal source of electrical power fails. The UPS shall provide a minimum of 10 minutes back-up power. A centralized UPS is to have a remote monitoring panel located at the command and control to report alarms associated with the UPS. The following loads shall be on UPS:

a) Primary communications system
b) Duress alarm system.
c) Computers.
d) VSS.
e) IDS.
f) Automation (AIE) excludes the island traffic arms.
g) Lighting:
- One luminaire for each ID check lane. This luminaire shall be located near the location where ID checks are performed.
- One luminaire at each AVB to include requirement of VSS cameras for real time assessment of activity detail.

h) Access Control Equipment including:
- AVB controls.
- Active barrier activation system for one complete operation cycle (opens to close and close to open). Hydraulic systems do not need to have the pump motor on UPS, if the system can maintain enough pressure for one complete cycle. The hydraulic pump motor then only needs to be on generator back-up power.
- Traffic arms located at the AVBs.
- Traffic sensors (wrong way, over speed, and presence detectors).
- Traffic signals and warning lights.

E. LIGHTNING PROTECTION REQUIREMENTS

1) A risk analysis in accordance with NFPA 780 is to be performed to determine if a lightning protection system is recommended. If recommended, but the Installation does not desire a lightning protection system, then the Installation shall provide direction in writing.

2) The lightning protection systems are to comply with the requirements found in UFC 3-575-01 "Lightning and Static Electricity Protection Systems".
3) Provide surge protection in accordance with requirements found in UFC 3-575-01 "Lightning and Static Electricity Protection Systems" and UFC 3-520-01 "Interior Electrical Systems". In addition, all exterior power panelboards and those panelboards that primarily power communications, LAN, security equipment and AVB controls are to have surge protection.
    - VSS

3.11 HEATING VENTILATION AND AIR CONDITIONING REQUIREMENTS

A. SIZING
1) Design Temperature
Outdoor Air Conditions

Per UFC 3-410-01, the outdoor design conditions must be based on the 1.0 percent dry bulb (DB) and corresponding mean coincident wet bulb (MCWB) for cooling, the 1.0 percent humidity ratio (HR) and corresponding mean coincident dry bulb (MCDB) for dehumidification design conditions, and the 99.0 percent DB for heating design conditions. Site and ambient design conditions were taken from ASHRAE Fundamentals 2025.

Site Information

Project Location	Grider Field, AR, USA
WMO Station #	723417
Elevation	204 FT
Latitude	34.180N
Longitude	91.934W
Climate Zone	3A

Ambient Design Conditions

Cooling (DB/MCWB)	94.9°F / 77.3°F
Dehumidification (DP/HR/MCDB)	76.5°F / 139.4 Grains / 84.8°F
Heating (DB)	25.7°F
Condensing Units (DB)	100°F

Indoor Air Conditions

Indoor environmental criteria in the table below are based on UFC 3-410-01.

Table 6-3: Indoor Design Conditions

Area Designation	Temperature (°F)			
	Minimum Winter	Maximum Summer	Minimum	Maximum

Storage	68	78	N/A	50
Elec/Mech Rooms	40	80	N/A	N/A
Comm Rooms	65	78	N/A	50
All Other	68	74	N/A	50

Refer Paragraph 5.0 and Paragraph 6.0 for sizing requirements

B. ALL STRUCTURES

1) Various spaces

The occupied portions of building (all types) require HVAC for occupant comfort unless otherwise not required by the Installation. Controls for temperature settings are to be easily accessed by personnel. Provide insulation on all ductwork, piping, equipment, and other items as required by code.

Provide exhaust for latrines or areas with a mop sink. The system is to maintain exhaust rates as required by the applicable code. Exhaust fans are to be accessible for repair or maintenance. Any make-up air required to maintain space ventilation requirements shall be an air delivery system that is independent of other facility HVAC systems. The system must provide cooling year round. The system shall provide heating, cooling, ventilation, air filtration with a minimum 8 and 13 Minimum Efficiency Reporting Value (MERV), and dehumidification (as determined during the design phase). Provide continuous exhaust in spaces containing an UPS unit. Provide a hydrogen sensor and associated alarms as required by applicable codes. Storm shelters shall be provided with ventilation system per applicable requirements.

3.12 ENERGY CONSERVATION REQUIREMENTS

See Paragraph 5.0 and Paragraph 6.0 for energy conservation requirements.

3.13 FIRE PROTECTION REQUIREMENTS

A. BUILDING FUNCTION REQUIREMENTS:

The scope of project is to construct an approximate 5,000 square foot Visitor Control Center (VCC), 934 square foot Gatehouse and two separate standalone canopies (one for ID Check and one for Truck Searches).

The facilities shall be designed in compliance with UFC 3-600-01 "Fire Protection Engineering for Facilitiesn.

The building will be classified as one-story of Type II-B (NFPA 220 Type 000) construction in accordance with IBC table 601, Table 504.3 and Sections 504.4. Separation between buildings shall be in accordance with IBC Chapter 6, except as modified by UFC 3-600-01.

The facilities are a combination of business and assembly uses.

For life safety and egress, the latest version of NFPA 101 shall be used in the development of the buildings. For general square footage, building areas, and heights, the latest version of IBC shall be complied with in the development of the buildings

B. FIRE SUPPRESSION SYSTEMS

The Design Build Contractor will design and install an automatic fire suppression system as the one-story buildings (VCC and Gatehouse) are not afforded the minimum required fire flow required by UFC 3-600-01. The fire suppression system is required to reduce the UFC 3-600-01 required fire flow requirements to a demand and pressure that is available and can be supplied by the existing fire protection water source.

The Design Build Contractor will provide and install all fire extinguishers, fire extinguisher brackets and cabinets in accordance with UFC 3-600-01 and NFPA 101 and located (spaced) and sized in accordance with NFPA 10. Office areas are required to be protected with 5-lb ABC fire extinguishers (example - 3-A:40B:C). Mechanical Rooms are required to be protected with a 10-lb ABC fire extinguisher (example 4-A:60B:C).

The Design Build Contractor will provide a minimum of two (2) fire hydrants based on the required fire flow of 1,500 gpm (2 hours) (UFC 3-600-01 and NFPA 1). All exterior walls must be within 350 feet of a fire hydrant (UFC 3-600-01 § 9-3.5.8.2).

On site fire hydrant flow testing (June 2024 - see attached fire flow test report - Appendix I) indicated a fire water flow of 1,157 gpm@ 20 psi. The minimum required fire flow (NFPA 1 - Table 18.4.5.2.1) is 1,500 gpm@ 20 psi for duration of 2 hours. UFC 3-600-01 Section 9-2.1 and NFPA 1142 have allowances to reduce the required fire flow to 1,000 gpm when the building is protected with an automatic sprinkler system.

C. FIRE ALARM SYSTEM AND MASS NOTIFICATION SYSTEM

The Design Build Contractor will provide a fire alarm system and mass notification system as required in accordance with UFC 4-010-01. The fire alarm and mass notification system's design and equipment selected shall be compatible with the existing base wide fire alarm system. The DB Contractor shall determine the Base Wide Fire Alarm Monitoring System make and manufacturer and the location of the Central Monitoring Center and transmit alarm signals to such.

3.14 SUSTAINABLE DESIGN

See Paragraph 5.0 and Paragraph 6.0 for sustainable design requirements.

3.15 EQUIPMENT AND FURNITURE REQUIREMENTS

3.15.1 FURNISHINGS

A. GENERAL

1) Conceal clips, screws, and other furniture construction elements where possible. Seating upholstery is required to meet Wyzenbeek Abrasion Test; 50,000 minimum double rubs. Furniture can be wood (where appropriate), plastic laminate, or metal finish. Tops for case goods with high pressure plastic laminate or metal construction are to be high pressure plastic laminate. Location, use, and frequency of moving furniture are to be considered when determining appropriate finish material and construction. Furniture constructed of particleboard with plastic laminate finish is not acceptable. Provide box and file drawers with a heavy-duty suspension system. Construct furniture with concealed fasteners. Furniture storage is to be lockable with keys provided to the user. Locks shall be keyed in accordance with user requirements. Coordinate style details and

finishes within a room. Clocks shall be provided in break rooms. Trash receptacles shall be provided in all employee workspaces.

a) Desk chair: Provide ergonomic desk chairs with non-upholstered adjustable height arms, padded, contoured, cushioned and upholstered or mesh seat and back, back tilt and locking capability, pneumatic seat height adjustment, adjustable lumbar support, seat depth adjustment, five star base, and casters. Provide desk chairs with adjustable seat height range of 4 1/2 inches, range to include 16 1/2 to 20 inches. Verify with user if armless desk chairs are preferred for employees carrying weapons. Armless task chair is to be provided in the Gate House.
b) High stool: Provide ergonomic swivel stool with adjustable height arms, padded, contoured, cushioned and upholstered or mesh seat and back, variable back lock, pneumatic seat height adjustment, adjustable lumbar support, seat depth adjustment, five star base, foot ring, and casters. Provide high stools with adjustable seat height range of 5 1/2 inches to include 20 to 25 1/2 inches.
c) Lateral file cabinet: Provide four drawer lateral file cabinet, unless limited by window design or other architectural features. File drawers are to be full extension, accommodate letter files, and have rails for hanging folders. The drawers are to be capable of hanging files side-to-side and front-to-back. Drawer pulls are to be an integral pull, not an attached pull. Counterweights are to be provided when required by the manufacturer for stability.
d) Bookcase: Provide four shelf metal bookcase(s) with adjustable shelves. Shelves are to be of sufficient height and depth to accommodate standard three-ring binders. Bookcases can be interchanged with lateral file cabinets, depending on user requirements or preferences.
e) Supply cabinet: Provide metal double door lockable supply cabinet with adjustable shelves.
f) Clock: Provide clock that is 12 inches in diameter with a bezel finish, acrylic cover, and quartz battery.
g) Trash receptacles: Provide rubber trash receptacles approximately 14 inches wide by 11 inches deep by 15 inches high.
h) Recycling receptacles: Provide rubber blue recycling receptacles approximately 14 inches wide by 11 inches deep by 15 inches high.

B. FF&E package is provided for coordination purposes only. All items are Government Furnished and Government Installed.

3.15.2 EQUIPMENT - NOT USED

3.16 FACILITY SPECIFIC REQUIREMENTS

These references are to be included in addition to those in Paragraph 4.0.

(1) UFC 1-200-02 2020) High Performance Sustainable Building Requirements
(2) UFC 3-101-01 (2011) Architecture with Change 2
(3) UFC 3-120-10 (2018) Interior Design
(4) UFC 3-301-01 (2013) Structural Engineering with Change 1
(5) UFC 3-310-04 (2013) Seismic Design for Buildings
(6) UFC 3-520-01 (2015) Interior Electrical Systems
(7) UFC 3-530-01 (2015) Interior and Exterior Lighting Systems and Controls
(8) UFC 3-575-01 (2012) Lightning and Static Electricity Protection Systems
(9) UFC 4-010-02 (2012)"DoD Minimum Antiterrorism Standoff Distances for Buildings (FOUO) includes Change 3".

(10) UFC 4-020-01 (2008) DoD Security Engineering Facilities Planning Manual
(11) UFC 4-021-02 (2013) Electronic Security Systems
(12) UFC 4-023-07 (2008) Design to Resist Direct Fire Weapons Effects
(13) ASTM F2656/ASTM F2656M (2015) "Standard Test Methods for Vehicle Crash Testing of Perimeter Barriers"
(14) Military Surface Deployment and Distribution Command Transportation Engineering Agency (SDDC-TEA) Pamphlet 55-15, "Traffic and Safety Engineering for Better Entry Control Facilities"
(15) Army Standard (AS) for Access Control Points(ACPs) - 13 April 2012 https://mrsi.erdc.dren.mil/cos/nwo/acp/

4.0 APPLICABLE CRITERIA

Although a specific document version or date may be indicated, use criteria from the most current references, including any applicable addenda, unless otherwise stated in the contract or task order, as of the date of the Contractor's latest accepted proposal or date of issue of the contract or task order solicitation, whichever is later. In the event of conflict between references and/or applicable military criteria, apply the most stringent requirement, unless otherwise noted in the contract or task order.

4.1 INDUSTRY CRITERIA

Applicable design and construction criteria references are listed in Table 1. This list is not intended to include all criteria that may apply or to restrict design and construction to only those references listed. References cited herein are not necessarily incorporated in their entirety. Refer to specific design requirements established in Paragraph 5.0 for applicability extents or limits. Refer also to Paragraph 3.0 for additional facility-specific applicable criteria.

Table 1: Industry Criteria

Air Conditioning, Heating, and Refrigeration Institute (AHRI)	
ANSI/AHRI/CSA 310/380-2017 (R2022)	Standard for Packaged Terminal Air-Conditioners and Heat Pumps (CSA-C744-04)
ANSI/AHRI 430-2020	Central Station Air Handling Units
ANSI/AHRI 440-2019 (R2024)	Performance Rating of Room Fan-Coils
ANSI/AHRI 880-2017 (R2023)	Performance Rating of Air Terminals, with Addendum 1
Air Movement and Control Association (AMCA)	
ANSI/AMCA 210-25 ANSI/ASHRAE 51-25	Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating
American Architectural Manufacturers Association (AAMA)	
AAMA 1503-2009	Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors, and Glazed Wall Sections
American Association of State Highway and Transportation Officials (AASHTO)	
GDHS-6	A Policy of Geometric Design of Highways and Streets, 6th Edition (Green Book)

GDPS-4-M	Guide for Design of Pavement Structures, 4th Edition with 1998 Supplement
HM-33	Standard Specifications for Transportation Materials and Methods of Sampling and Testing, 33rd Edition and AASHTO Provisional Standards, 2013 Edition
LTS-6	Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 6th Edition
RSDG-4	Roadside Design Guide, 4th Edition
American Bearing Manufacturers Association (ABMA)	
ABMA 9-2015 (R2020)	Load Ratings and Fatigue Life for Ball Bearings
AFBMA 11-2014 (R2020)	Load Ratings and Fatigue Life for Roller Bearings
American Concrete Institute	
ACI PRC 302.2-22	Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials
ACI 318-2022	Building Code Requirements for Structural Concrete and Commentary
TMS 402/602-22	Building Code Requirements and Specifications for Masonry
Structures and Related Commentaries	
MNL-66(22)	ACI Detailing Manual
American Institute of Steel Construction (AISC)	
AISC 325	Steel Construction Manual, 16th Edition
AISC 327	Seismic Design Manual, 4th Edition
American Iron and Steel Institute (AISI)	
AISI S100-16 (2020) w/ S2-20	North American Specification for the Design of Cold-Formed Steel Structural Members, 2016 Edition (Reaffirmed 2020) with supplement 2,2020 Edition
American National Standards Institute (ANSI)	
IEEE C2-2012	National Electrical Safety Code
ANSI Z21.10.1-2014 / CSA 4.1-2014	Gas Water Heaters - Volume 1, Storage Water Heaters with Input Ratings of 75,000 Btu per Hour or Less
ANSI Z21.101-2012/ CSA 8.5-2012	Gas Hose Connectors for Portable and Moveable Gas Appliances
ANSI Z124.3-2005	Plastic Lavatories
ANSI Z124.6-2007	Plastic Sinks
American Society of Civil Engineers (ASCE)	
ASCE/EWRI 45-06	Standard Guidelines for the Design of Urban Stormwater Systems
ASCE/EWRI 46-06	Standard Guidelines for the Installation of Urban Stormwater Systems
ASCE/SEI 7-22	Minimum Design Loads for Buildings and Other

	Structures
American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)	
ASHRAE Guideline 0-2019	The Commissioning Process
ASHRAE Guideline 1.1-2025	HVAC&R Technical Requirements for The Commissioning Process
ASHRAE Standard 15-2024	Safety Standard for Refrigeration Systems
ASHRAE Standard 55-2023	Thermal Environmental Conditions for Human Occupancy
ASHRAE Standard 62.1-2025	Ventilation for Acceptable Indoor Air Quality
ASHRAE Standard 90.1-2019	Energy Standard for Buildings Except Low-Rise Residential Buildings, SI Edition
ASHRAE Standard 189.1-2023	Standard for the Design of High-Performance Green Buildings (ANSI Approved; USGBC and IES Co- sponsored)
American Society of Mechanical Engineers International (ASME)	
ASME B31 (Series)	Piping Code Series, Various Dates (Current Versions)
American Water Works Association (AWWA)	
	AWWA Standards: Full Set of Standards (Current Versions)
American Welding Society	
WHB	Welding Handbook, Ninth Edition Vol.1-5; Current Versions
	Welding Codes and Specifications (As Applicable)
American Wood Council (AWC)	
ANSI/AWC NDS-2024	National Design Specification (NDS) for Wood Construction with Commentary, with 2018 NDS Supplement
ANSI/AWC SDPWS-2021	Special Design Provisions for Wind and Seismic
Associated Air Balance Council (AABC)	
	AABC National Standards for Total System Balance (Current Version)
	AABC Test and Balance Procedures (Current Version)
ASTM International	
ASTM C1060-23	Standard Practice for Thermographic Inspection of Insulation Installations in Envelope Cavities of Frame Buildings
ASTM E779-19	Standard Test Method for Determining Air Leakage Rate by Fan Pressurization
ASTM E1827-22	Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door

Builders Hardware Manufacturers Association (BHMA)	
ANSI/BHMA A156 Series	ANSI/BHMA A156 Series Standards, Various Dates (Current Versions)
Building Industry Consulting Service International	
BICSI TDMM	Telecommunications Distribution Methods Manual, 13th Edition
BICSI OSPDRM	Outside Plant Design Reference Manual, 5th Edition
Code of Federal Regulations (CFR)	
49 CFR 192	Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards
10 CFR 430	Energy Conservation Program for Consumer Products
Consumer Electronics Association (CEA)	
CEA 709.1-D (ANSI)	Control Network Protocol Specification
CEA 709.3 R-2015 (ANSI)	Free-Topology Twisted-Pair Channel Specification
CEA 852-C (ANSI)	Tunneling Device Area Network Protocols Over Internet Protocol Channels
Federal Highway Administration (FHWA)	
FHWA-NHI-10-009	Urban Drainage Design Manual, HEC-22, Third Edition
MUTCD	Manual on Uniform Traffic Control Devices for Streets and Highways with Revisions
Illuminating Engineering Society (IES)	
ANSI/IES RP-1-12	American National Standard Practice for Office Lighting
ANSI/IES RP-8-14	Roadway Lighting
IES DG-18-08	Light + Design: A Guide to Designing Quality Lighting for People and Buildings
Institute of Electrical and Electronics Engineers (IEEE)	
IEEE/ASTM SI_10-2010	American National Standard for Metric Practice
IEEE Standard 1100-2005	IEEE Emerald Book: IEEE Recommended Practice for Powering and Grounding Electronic Equipment
International Organization for Standardization (ISO)	
ISO 6781:1983	Qualitative Detection of Thermal Irregularities in Building Envelopes – Infrared Method
International Plumbing Code (IPC)	
IPC	2024 International Plumbing Code
International Building Code (IBC)	
IBC	2024 International Building Code
International Mechanical Code (IBC)	
IMC	2024 International Mechanical Code
BACnet International (BACnet)	
	BACnet Interoperability Guidelines (utilizing

	Niagara framework)
	BACnet Resource Files (utilizing Niagara framework)
Metal Building Manufacturers Association (MBMA)	
	Metal Building Systems Manual, 202024 Edition
Midwest Insulation Contractors Association (MICA)	
	National Commercial and Industrial Insulation Standards Manual, 9th Edition
National Association of Corrosion Engineers (NACE) International	
SP0169-2013	Control of External Corrosion on Underground or Submerged Metallic Piping Systems
SP0185-2007	Extruded Polyolefin Resin Coating Systems with Soft Adhesives for Underground or Submerged Pipe
SP0285-2011	Corrosion Control of Underground Storage Tank Systems by Cathodic Protection
SP0286-2007	Electrical Isolation of Cathodically Protected Pipelines
National Environmental Balancing Bureau (NEBB)	
PST-TAB-2005	Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems, 2005 – Seventh Edition
National Fire Protection Association (NFPA)	
NFPA 10	Standard for Portable Fire Extinguishers
NFPA 70	National Electrical Code
NFPA 70E	Standard for Electrical Safety in the Workplace
NFPA 90a	Standard for the Installation of Air-Conditioning and Ventilating Systems
NFPA 101	Life Safety Code
NFPA 780	Standard for the Installation of Lightning Protection Systems
National Roofing Contractors Association (NRCA)	
	The NRCA Roofing Manual – 2013, Set
Occupational Safety and Health Administration (OSHA)	
29 CFR 1926	Safety and Health Regulations for Construction
Plumbing and Drainage Institute (PDI)	
PDI WH201	Water Hammer Arrestors Standard
Sheet Metal and Air Conditioning Contractors' National Association (SMACNA)	
	HVAC Duct Construction Standards - Metal and Flexible (Current Version)
	Architectural Sheet Metal Manual, Current Version
	HVAC Systems - Testing, Adjusting and Balancing (Current Version)

State & Local Regulations	
	State Specific Environmental Control Requirements
	State Specific Department of Transportation Standard Specifications for Highway and Bridge Construction
	State Specific Sedimentation and Erosion Control Design Requirements
	State Specific Storm Water Management Requirements
Publication 242	PennDOT Pavement Policy Manual
Publication 111	PennDOT Traffic Control Pavement Markings and Signing Standards
Publication 236	PennDOT Handbook of Approved Signs
Publication 13	PennDOT Design Manual 2: Highway Design
Publication 72	PennDOT Roadway Construction (RC) Standards
75 PA C.S.	Pennsylvania Vehicle Code
67 PA C.S. 212	Pennsylvania Official Traffic Control Devices
Steel Door Institute (SDI)	
ANSI/SDI A250.8-2003 (R2008)	SDI-100 Recommended Specifications for Standard Steel Doors and Frames
Steel Deck Institute (SDI)	
SDI-DDM4	Diaphragm Design Manual, Fourth Edition
ANSI/SD1 SD-2022	Standard for Steel Deck with Supplement 1
ANSI/SD1 QA/QC-2022	Standard for Quality Control and Quality Assurance for Installation of Steel Deck
Steel Joist Institute (SJI)	
SJI 100-2025	Standard Specifications for K-Series, LH-Series, and DLH-Series Open Web Joists and for Joist Girders
Telecommunications Industry Association (TIA)	
TIA-568 Set	Commercial Building Telecommunications Cabling Standard Set, 2015 Edition
TIA-569	Telecommunications Pathways and Spaces, Edition D
TIA-606	Administration Standard for the Telecommunications Infrastructure, Edition B
TIA-607	Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises, Edition C
Underwriters Laboratories (UL)	
UL 96A	Standard for Installation Requirements for Lightning Protection Systems
UL 300	Standard for Fire Testing of Fire Extinguishing Systems for Protection of Commercial Cooking Equipment

U.S. ACCESS BOARD	
ABA	Architectural Barriers Act (ABA) Accessibility Guidelines, 2015 Version.

4.2 MILITARY CRITERIA

The project shall conform to the following criteria. Certain design impacts and features due to these criteria are noted for the benefit of the OFFEROR; however, all requirements of the referenced criteria will be applicable, whether noted or not, unless otherwise specified herein.

Table 2: Military Criteria

Laws, Policies, Regulations, and Other Criteria	
AEIM	Architectural and Engineering Manual (AEIM) U.S. Army Corps of Engineers Southwestern Division, January 2003
EISA07	Energy Independence and Security Act of 2007
EM 385-1-1	Safety and Occupational Health (SOH) Requirements
EO 12770	Metric Usage In Federal Government
EPACT05	Energy Policy Act of 2005 / Public Law 109-58
I3A	Technical Criteria for Installation Information Infrastructure Architecture (I3A)
STIC	U.S. Army Information Systems Engineering Command (USAISEC) SECRET Internet Protocol (IP) Router Network (SIPRNET) Technical Implementation Criteria (STIC)
TB MED 530	Occupational and Environmental Health Food Sanitation
SDDC-TEA Pamphlet 55-15	Military Surface Deployment and Distribution Command Transportation Engineering Agency – Traffic and Safety Engineering for Better Entry Control Facilities
DOD MUTCD	DOD Supplement to the Manual on Uniform Traffic Control Devices for Streets and Highways
NG DG 415-5	Army National Guard General Facilities Information Design Guide
NG Pam 415-5	Army National Guard Military Construction Program Execution
ICC 500 (2023)	ICC/NSSA Standard for the Design and Construction of Storm Shelters
Unified Facilities Criteria (UFC)	
UFC 1-200-01 (Current Version)	DOD Building Code
UFC 1-200-02 (Current Version)	High Performance and Sustainable Building Requirements
UFC 3-101-01 (Current Version)	Architecture
UFC 3-110-03 (Current Version)	Roofing
UFC 3-120-01 (Current Version)	Design: Sign Standards

UFC 3-120-10 (Current Version)	Interior Design
UFC 3-201-01 (Current Version)	Civil Engineering
UFC 3-201-02 (Current Version)	Landscape Architecture
UFC 3-210-10 (Current Version)	Low Impact Development
UFC 3-220-01 (Current Version)	Geotechnical Engineering
UFC 3-301-01 (Current Version)	Structural Engineering
UFC 3-401-01 (Current Version)	Mechanical Engineering
UFC 3-410-01 (Current Version)	Heating, Ventilating, and Air Conditioning
UFC 3-410-02 (Current Version)	Direct Digital Control for HVAC and Other Building Control Systems
UFC 3-420-01 (Current Version)	Plumbing Systems
UFC 3-450-01 (Current Version)	Noise and Vibration Control
UFC 3-470-01 (Current Version)	Utility Monitoring and Controls System (UMCS) Front End and Integration
UFC 3-501-01 (Current Version)	Electrical Engineering
UFC 3-520-01 (Current Version)	Interior Electrical Systems
UFC 3-530-01 (Current Version)	Interior and Exterior Lighting Systems and Controls
UFC 3-550-01 (Current Version)	Exterior Electrical Power Distribution System
UFC 3-570-01 (Current Version)	Cathodic Protection
UFC 3-575-01 (Current Version)	Lighting & Static Electricity Protection Systems
UFC 3-600-01 (Current Version)	Fire Protection Engineering for Facilities.
UFC 4-010-01 (Current Version)	DoD Minimum Antiterrorism Standards for Buildings
UFC 4-010-06 (Current Version)	Cybersecurity of Facility Related Control Systems
UFC 4-020-01 (Current Version)	DoD Security Engineering Facilities Planning Manual
UFC 4-021-01 (Current Version)	Design and O&M: Mass Notification Systems
UFC 4-022-01 (Current Version)	Entry Control Facilities Access Control Points
UFC 4-022-02 (Current Version)	Selection and Application of Vehicle Barriers
UFC 4-022-03 (Current Version)	Security Fences and Gates
UFC 4-023-07 (Current Version)	Design to Resist Direct Fire Weapons Effects

5.0 GENERAL TECHNICAL REQUIREMENTS

This paragraph contains technical requirements with general applicability to Army facilities. See also Paragraph 3.0 for facility type-specific operational, functional, and technical requirements. Residential or similar grade finishes and materials are not acceptable for inclusion in these buildings, unless otherwise specifically allowed.

5.1 SITE PLANNING AND DESIGN

5.1.1 STANDARDS AND CODES

The site planning and design shall conform to applicable criteria and to Paragraph 6.0.

5.1.2 SITE SELECTION

Meet the allowable site requirements of ASHRAE Standard 189.1, Section 5.3, Mandatory Provisions, and either Section 5.4, Prescriptive Option, or Section 5.5, Performance Option; and ASHRAE Standard 189.1, Section 10.3.2.1.1, unless otherwise specified by the current Department of Defense Minimum Antiterrorism Standards for Buildings, UFC 4-010-01.

5.1.3 SITE PLANNING OBJECTIVES

See Paragraph 3.0 for additional site planning requirements relating to building functions.

5.1.3. lVEHICULAR CIRCULATION

Apply design vehicle templates provided by AASHTO to the site design. The passenger car class includes passenger cars and light trucks, such as vans and pick-ups. The passenger car template is equivalent to the non-organizational privately owned vehicle. The truck class template includes single-unit trucks, recreation vehicles, buses, truck tractor-semi-trailer combinations, and trucks or truck tractors with semi-trailers in combination with full trailers. Provide vehicle clearances required to meet traffic safety for emergency vehicles, service vehicles, and moving vans. Provide required traffic control signage site entrances and site drive aisles shall maximize spacing between drives, incorporate right-angle turns, and limit points of conflict between traffic. Design services drives to restrict access to unauthorized vehicles by removable bollards, gates, or other barriers to meet AT/FP requirements. Orient service drives to building entrances other than the primary pedestrian entry at the front of the building.

5.1.3.2 EMERGENCY VEHICLE ACCESS

Provide emergency vehicle access around the facility in accordance with AT/FP requirements.

5.1.3.3 STORMWATER MANAGEMENT AND LOW IMPACT DESIGN

Employ design and construction strategies (best management practices, or BMPs) that reduce stormwater runoff, reduce discharges of polluted water offsite, and maintain or restore predevelopment hydrology with respect to temperature, rate, volume, quality, and duration of flow. See "Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act (EISA)ll (http://www.epa.gov/owow/NPS/lid/section438/pdf/final_sec438_eisa.pdf) and Paragraph 6.0 for additional information. BMPs used to treat runoff must be capable of removing 80 percent of the average annual post-development total suspended solids (TSS) load based on existing monitoring reports. BMPs are considered to meet these criteria if:

A. They are designed in accordance with standards and specifications from a state or local program that has adopted these performance standards.
B. There exists infield performance monitoring data demonstrating compliance with the criteria. Data must conform to accepted protocol (for example, Technology Acceptance Reciprocity Partnership [TARP], Washington State Department of Ecology) for BMP monitoring.

C. In addition, meet the requirements of ASHRAE Standard 189.1, Section 5.3, and either Section 5.4, Prescriptive Option or Section 5.5 Performance Option for Site Development and UFC 3-210-10. If any of the requirements in this subsection are prohibited by state law, state law shall take precedence but only as to those requirements found to be in conflict.

5.1.3.4 EROSION AND SEDIMENT CONTROL

Meet the requirements of ASHRAE Standard 189.1, Section 10.3.1.3.

5.1.4 EXTERIOR SIGNAGE

In accordance with UFC 3-120-01 Design: Sign Standards, with Change 2.

5.1.5 EXISTING UTILITIES

Base utilities maps for this site are included as part of this RFP. See Paragraph 6.0 for more detailed information.

5.2 SITE ENGINEERING

5.2.1 STANDARDS AND CODES

The site engineering shall conform to applicable criteria.

5.2.2 SOILS

5.2.2.1SUBSURFACE CONDITIONS INFORMATION

Preliminary geotechnical information has been provided to characterize the subsurface conditions at the project site and is appended to these specifications. The geotechnical report provided in Appendix Bis intended for informational purposes only. The contractor's team may utilize the boring logs and test results to assess site characteristics; however, reliance on the geotechnical analysis itself is not advised.

5.2.2.2GEOTECHNICAL EVALUATION REPORT

The Contractor's team shall perform a geotechnical investigation according to EM 1110-1-1804 and under the direction of a registered professional geotechnical engineer holding current state licensure to develop earthwork and foundation recommendations and design parameters in which to base the Contractor's design. The Contractor's licensed geotechnical engineer shall prepare a final geotechnical evaluation report, to be submitted along with the first foundation design submittal, as described in Section 01 33 16, Design After Award.

5.2.3 VEHICLE PAVEMENTS

5.2.3.1PAVEMENT REQUIREMENTS

See Paragraph 6.4.2 for pavement design requirements. See Paragraph 5.2.2.2 and Section 01 33 16 for required information for the Contractor's geotechnical evaluation report. Provide underdrain systems for pavement designs over cohesive soil subgrades. Design roads and parking areas for a life expectancy of 25 years with normal maintenance. Parking area for tactical vehicles (as applicable to the project) shall be Portland Cement Concrete rigid pavement design. For concrete pavements, submit joint layout plan for review and concurrence.

5.2.4 CATHODIC PROTECTION

Provide cathodic protection systems for all underground metallic systems and metallic fittings and portions of non-metallic, underground systems, both inside and outside the building 5-foot line that are subject to corrosion. Coordinate final solutions with the Installation to ensure an approach that is consistent with Installation cathodic protection programs.

5.2.5 UTILITIES

See Paragraph 6.4.6 for specific information on ownership of utilities and Paragraph 5.9.3.2 for utility metering requirements.

5.2.6 PERMITS

The Contractor shall be responsible for obtaining all permits (local, state, and federal) required for design and construction of all site features and utilities.

5.2.7 EPA WATERSENSE PRODUCTS AND CONTRACTORS

Except where precluded in this paragraph or by other project requirements, use EPA WaterSense labeled products and irrigation Contractors that are certified through a WaterSense labeled program where available.

5.3 COMMISSIONING

Execute total building commissioning practices to verify performance of building components and systems and ensure that Owner Project Requirements are met. The Government, in its capacity as the Commissioning Authority (CxA), shall assure the execution of the commissioning process activities are compliant with the Owner Project Requirements and Basis of Design. Defined roles and responsibilities for the commissioning team shall be outlined in the commissioning plan. The commissioning plan is a living document and must be updated at a minimum during the following phases of a project: design, construction, and post occupancy.

5.3.1 DESIGN-BUILD CONTRACTOR

Must provide a certified Commissioning Specialist (CxC) as certified by BCA, ACG, ICB, or NEBB, with defined roles and responsibilities as outlined in Annex F of ASHRAE Guideline O for the CxA. Although USACE is the CxA (in an oversight role), the CxC is responsible for executing all design, construction, and post occupancy phase commissioning tasks as indicated in ASHRAE Guideline O for the CxA. The CxC must be an independent first tier subcontractor hired by the construction contractor. For smaller and less complex projects and with documented requisite experience, qualifications, and certification the CxC may be employed by the Design-Build Contractor.

5.3.2 THE DESIGN-BUILD CONTRACTOR

Updates and maintains the commissioning plan. The commissioning plan will include the following systems to be commissioned:

A. HVAC systems

B. Lighting systems

C. Envelope

D. Plumbing systems

E. Electrical power distribution, emergency power

The commissioning plan development shall be guided by the requirements of ASHRAE Standard 189.1 Section 10.3.1.2, ASHRAE Guideline 0, and ASHRAE Guideline 1.1. Do not use the sampling techniques discussed in ASHRAE Guideline 1.1 and in ASHRAE Guideline 0. Commission 100 percent of the controls and equipment. Commissioning activities that occur in the design phase, construction phase, and post occupancy phase must be included in the overall integrated project schedule. In conjunction with manufacturer's performance parameters and requirements, the CxC is responsible for

establishing the quantitative criteria for testing all systems based on the design criteria to include air flow, heating and cooling, architectural layout, and loading capacity requirements. Execute HVAC controls trend logging to include graphic representation and provide evaluation report of results. Perform and document a post occupancy system monitoring and inspection, concurrent with the 9-month warranty inspection, to review building operation after beneficial occupancy. Post occupancy system monitoring and inspection results will be used to verify compliance with the Owner Project Requirements and Basis of Design. Revise and update the Systems Manual and the Final Commissioning Report and submit it to government for review and approval.

5.4 ARCHITECTURE AND INTERIOR DESIGN

5.4.1 STANDARDS AND CODES

The architecture and interior design shall conform to applicable criteria.

5.4.2 GENERAL

Overall architectural goals are to provide a functional, quality, and visually appealing facility that meets expected usable life standards and is a source of pride for the Installation and delivered within the available budget and schedule.

5.4.3 MATERIAL AND RESOURCES

Meet ASHRAE Standard 189.1, Section 9.3, Mandatory Provisions, and either Section 9.4, Prescriptive Option, or Section 9.5, Performance Option.

5.4.3.1 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

Meet the requirements of ASHRAE Standard 189.1, Section 9.3.1. A waste management plan and waste diversion reports are required, as detailed in Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS and Section 01 74 19 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT.

5.4.4 COMPUTATION OF AREAS

The procedures for calculation of building area measurements for compliance with the total scope limitations of Paragraph 3.0 of this document shall follow UFC 3-101-01, Section 2-2, Building Area Calculations. The total gross square footage in Paragraph 3.0 shall not be exceeded based on these calculations. The procedures for calculating building area for any other criteria shall follow the procedures as defined in those criteria (for example, building/life safety code compliance). The procedures for calculation of building area measurements for specialized facilities such as medical facilities, military family housing, or unaccompanied enlisted personnel housing are defined in their respective UFCs.

5.4.5 BUILDING EXTERIOR

Design buildings to enhance or complement the visual environment of the Installation and reflect a human scale to the facility. Building entrance shall be architecturally defined and easily seen. Exterior materials, roof forms, and detailing shall be compatible with the surrounding development and adjacent buildings on the Installation and follow locally established architectural themes. Use durable materials that are easy to maintain. Exterior materials colors shall conform to the Installation requirements and if brick or stone, have color that is throughout the material. See Paragraph 6.0for project specific requirements.

5.4.5.1 BUILDING NUMBERS

Permanently attach exterior signage on two faces of each building indicating the assigned building number or address.

5.4.5.2 ROOFS AND EXTERIOR WALLS

Meet the requirements of ASHRAE Standard 189.1, Section 5.3, Mandatory Provisions, and Section 5.4, Prescriptive Option, or Section 5.5, Performance Option. In addition, if a green roof is considered for this project, meet the requirements of ASHRAE Standard 6.2, Mandatory Provisions, and Section 6.3, Prescriptive Option, or Section 6.4, Performance Option.

6.1.1 BUILDING INTERIOR

5.4.5.2 DAYLIGHTING AND LOW EMITTING MATERIALS

Meet the requirements of ASHRAE Standard 189.1, Section 8.3, Mandatory Provisions, and either Section 8.4, Prescriptive Option, or 8.5, Performance Option. In addition, meet the daylighting requirements of ASHRAE Standard 189.1, Section 7.3, Mandatory Provisions, and either Section 7.4, Prescriptive Option, or Section 7.5, Prescriptive Option.

5.4.5.3 SURFACES AND COLOR

A. Surfaces: Appearance retention is the top priority for building and furniture related finishes. Provide low maintenance, easily cleaned room finishes that are commercially standard for the facility occupancy specified, unless noted otherwise. In day lit zones, meet the requirements of ASHRAE Standard 189.1 section 8.4.1.
B. Color: The color, texture, and pattern selections for the finishes of the building shall provide an aesthetically pleasing, comfortable, easily maintainable, and functional environment for the occupants and shall be approved by USACE ACP-COS. Coordinate the building colors and finishes for a cohesive design. Select colors appropriate for the building type. Use color, texture and pattern to provide wayfinding through the building. Trendy colors that will become dated shall be limited to non-permanent finishes such as paint. Select finishes with regard to aesthetics, maintenance, durability, life safety, and image. Limit the number of similar colors for each material. Plastic laminate and solid surface materials shall have patterns that are patterned, mottled, flecked, or speckled. Wood-look laminate is acceptable. Coordinate finish colors of fire extinguisher cabinets, receptacle bodies and plates, warning lights, emergency lighting, and other miscellaneous items with the building interior. Match color of equipment items on ceilings (speakers, smoke detectors, grills, etc.) to the ceiling color or as close as possible. Locations with color accent soffits may deviate from this requirement and shall match other adjacent devices.

5.4.5.4 BUILDING ENTRANCE

Meet the requirements of ASHRAE Standard 189.1, Section 8.3.1.5.

5.4.5.5 SIGNAGE

Provide interior signage for overall way finding and life safety requirements as in accordance with UFC 3-120-01 Design: Sign Standards, with Change 2. A comprehensive interior plan shall be from one manufacturer. Signage to be tactile and include braille. Use of emblems or logos may be incorporated into the signage design.
Include the following sign types:

- Lobby directory

Directional signs
- Room identificationsigns
- Building service signs
- Regulatory signs
  Official and unofficial signs
- Visual communication boards
- No smoking signage that conveys building smoking policy
- Exit sign at all doors leading to the exterior of the building

5.4.6.SWINDOW TREATMENT

All exterior windows and interior windows are to receive blinds in a color selected by the architect from the manufacturer's standard range of colors. Color shall complement building's design theme. Maintain uniformity of treatment color and material to the maximum extent possible within a building.

5.4.6.6 CASEWORK

Unless otherwise specified, all casework for cabinetry and cases shall be minimum custom grade, as described in the Architectural Woodwork Institute Quality Standards.

6.1.2 TERMITE TREATMENT AND GREEN CLEANING

Provide termite prevention treatment in accordance with Installation and local building code requirements, using licensed chemicals and licensed applicator firm. In all states, meet the requirements of ASHRAE Standard 189.1, Section 10.3.2, regarding the building green cleaning plan.

6.1.3 COMPREHENSIVE INTERIOR DESIGN (CID)

5.4.8.1 SID AND FF&E

Comprehensive Interior Design (CID) includes the integration of SID and FF&E design and package. SID requires the design, selection, and coordination of interior finish materials that are integral to or attached to the building structure. Completion of a SID involves the selection and specification of applied finishes for the building's interior features including, but not limited to, walls, floors, ceilings, trims, doors, windows, window treatments, built-in furnishings and installed equipment, lighting, and signage. The SID package includes finish schedules, finish samples, and any supporting interior elevations, details, or plans necessary to communicate the building finish design and build out. The SID provides basic space planning for the anticipated FF&E requirements in conjunction with the functional layout of the building and design issues such as life safety, privacy, acoustics, lighting, power/data, ventilation, and accessibility. See Section 01 33 16 for SID design procedures. The SID and FF&E shall comply with Unified Facilities Criteria (UFC) Interior Design UFC 3-120-10, Army Access Control Points (ACPs) Standard Design and UFC 1-200-02.

5.4.8.2 FF&E PACKAGE

The FF&E design and package include the design, selection, and color coordination of the required furnishing items necessary to meet the functional, operational, sustainable, and aesthetic needs of the facility coordinated with the interior finish materials in the SID. The FF&E package includes Basis of Design selections and specifications, procurement documentation, placement plans, and Basis of Design finish information on all freestanding furnishings and accessories, and a cost estimate. Coordinate the selection of furniture style, function and configuration with the defined requirements. Examples of FF&E items include, but are not limited to workstations, seating, files, tables, beds, wardrobes, draperies, and

accessories as well as marker boards, tack boards, and presentation screens. Criteria for furniture selection include function and ergonomics, maintenance, durability, sustainability, comfort, and cost. See Section 01 33 16 for FF&E design procedures.

FF&E package is provided for coordination purposes only. All items are Government Furnished and Government Installed.

6.2 STRUCTURAL DESIGN

6.2.1 STANDARDS AND CODES

The structural design shall conform to applicable criteria.

6.2.2 GENERAL

The structural system must be compatible with the intended functions and components that allow for future flexibility and reconfiguration of the interior space. (Do not locate columns, for instance, in rooms requiring visibility, circulation, or open space, including, but not limited to entries, hallways, common areas, and classrooms). Select an economical structural system based on facility size, projected load requirements, and local availability of materials and labor. Base the structural design on accurate, site specific geotechnical information and anticipated loads for the building types and geographical location. Consider climate conditions, high humidity, industrial atmosphere, saltwater exposure, or other adverse conditions when selecting the type of cement and admixtures used in concrete, the concrete cover on reinforcing steel, the coatings on structural members, expansion joints, the level of corrosion protection, and the structural systems. Analyze, design, and detail each building as a complete structural system. Design structural elements to preclude damage to finishes, partitions, and other frangible, non-structural elements to prevent impaired operability of moveable components; and to prevent cladding leakage and roof ponding. Limit deflections of structural members to the allowable of the applicable material standard, for example, ACI, American Institute of Steel Construction (AISC), and Brick Industry Association. When modular units or other pre-fabricated construction is used or combined with stick-built construction, fully coordinate and integrate the overall structural design between the two different or interfacing construction types. If the state that the project is located in requires separate, specific licensing for structural engineers (for instance, such as in Florida and California), then the structural engineer designer of record must be registered in that state.

6.2.3 LOADS

See Paragraph 3.0 for facility specific (if applicable) and Paragraph 6.0 for site and project specific structural loading criteria. Unless otherwise specified in Paragraph 6.0, use Exposure Category C for wind. If not specified, use Category C unless the Designer of Record can satisfactorily justify another exposure category in its design analysis based on the facility master plan. Submit such exceptions for approval as early as possible and prior to the interim design submittal in Section Design After Award. Design the ancillary building items, for example, doors, window jambs and connections, overhead architectural features, systems and equipment bracing, ducting, and piping for gravity, seismic, lateral loads, and for the requirements of UFC 4-010-01, DOD Minimum Antiterrorism Standards for Buildings. Ensure and document that the design of glazed items includes, but is not limited to, the following items under the design loads prescribed in UFC 4-010-01:

A. Supporting members of glazed elements, for example, window jamb, sill, header
B. Connections of glazed element to supporting members, for example, window to header
C. Connections of supporting members to each other, for example, header to jamb
D. Connections of supporting members to structural system, for example, jamb to foundation.

6.3 THERMAL PERFORMANCE

6.3.1 STANDARDS AND CODES

Building construction and thermal insulation for mechanical systems shall conform to applicable criteria.

6.3.2 BUILDING ENVELOPE SEALING PERFORMANCE REQUIREMENT

Design and construct the building envelope for buildings with a continuous air barrier to control air leakage into, or out of, the conditioned space that shall meet the requirements of ASHRAE Standard 189.1, Section 7.3, Mandatory Provisions, and either Section 7.4, Prescriptive Option, or 7.5, Performance Option. In addition, meet the requirements of ASHRAE Standard 189.1, Sections 10.3.1.4, 10.3.1.5, 10.3.1.6, and 10.3.2 as well as UFC 3-101-01, Section 3-6. Clearly identify all air barrier components of each envelope assembly on construction documents and detail the joints, interconnections, and penetrations of the air barrier components. Clearly identify the boundary limits of the building air barriers, and of the zone or zones to be tested for building air tightness on the drawings. The use of painted interior walls is not an acceptable air barrier method.

5.6.2.1 AIR BARRIER

The air barrier must be durable to last the anticipated service life of the assembly.

5.6.2.2 THERMAL BRIDGE

A thermal bridge (or cold bridge) occurs when a thermally conductive material (such as a metal stud, steel frame, or concrete beam, slab, or column) penetrates or bypasses the exterior insulation system. Design the building envelope to align all insulating elements, that is, the continuous wall insulation, insulated glazing, insulated doors from top of footing to bottom of roof deck. Wrap insulation around roof overhangs. Disconnect window and door sills from interior construction. Use thermally broken window and door frames. Provide details to eliminate thermal bridges particularly at floor slabs, roof/wall intersections, steel lintels and relief angles, metal through-wall flashings, and at building corners

5.6.2.3 DAMPER AND CONTROL

Close all ventilation or make-up air intakes and exhausts, etc., when leakage can occur during inactive periods.

5.6.2.4 TESTING, ADJUSTING, AND BALANCING

Test and balance air using a firm certified for testing and balancing by the Associated Air Balance Council (AABC), National Environmental Balancing Bureau (NEBB), or the Testing Adjusting, and Balancing Bureau (TABB). The prime Contractor shall hire the TABB firm directly, not through a subcontractor. Perform TAB in accordance with the requirements of the standard under which the TAB firm's qualifications are approved, that is, AABC MN-1, NEBB TABES, or SMACNA HVAC TAB, unless otherwise specified herein.

All recommendations and suggested practices contained in the TAB Standard shall be considered mandatory. Use the provisions of the TAB Standard, including checklists, report forms, etc., as nearly as practicable to satisfy the contract requirements. Use the TAB Standard for all aspects of TAB, including qualifications for the TAB firm and specialist and calibration of TAB instruments. Where the instrument manufacturer calibration recommendations are more stringent than those listed in the TAB Standard, adhere to the manufacturer's recommendations. All quality assurance provisions of the TAB Standard such as performance guarantees shall be part of this contract. For systems or system components not covered in the TAB Standard, the TAB specialist shall develop TAB procedures. Where new procedures, requirements, etc., applicable to the contract requirements have been published or adopted by the body responsible for the TAB Standard used (AABC, NEBB, or TABB), the requirements and recommendations contained in these procedures and requirements are mandatory.

5.6.2.SPERFORMANCE CRITERIA AND SUBSTANTIATION

Test the completed building for air tightness in accordance with UFC 3-101-01, Section 3-6.3. Submit the qualifications and experience of the testing entity for approval. Demonstrate performance of the continuous air barrier for the opaque building envelope by the following tests:

A. Air barrier quality control plan: Develop an air barrier quality control plan to assure that a competent air barrier inspector/specialist inspects the critical components prior to them being concealed. At a minimum, three onsite inspections are required during construction to assure the completeness of the construction and design.
B. Notification of testing: Notify the Government at least 3 working days prior to the tests to provide the Government with the opportunity to witness the tests. Provide the Government with written test results confirming the results of all tests.

6.4 PLUMBING AND WATER CONSUMING EQUIPMENT

6.4.1 STANDARDS AND CODES

The plumbing system and water consuming equipment shall conform to applicable criteria and applicable UFCs, applicable International Plumbing Code, ASHRAE Standard 189.1, Section 6.3, Mandatory Provisions, and either Section 6.4, Prescriptive Option, or Section 6.5, Performance Option. In addition, meet the requirements of ASHRAE Standard 189.1, Section 10.3.2.

6.4.2 HOT WATER SYSTEMS

For domestic hot water heating and supply systems, meet the requirements in UFC 3-420-01 and amendments, and the service water heating requirements of ASHRAE 189.1, Section 7.4.4.

6.4.3 SIZING HOT WATER SYSTEMS

Unless otherwise specified or directed in Paragraph 3.0, design in accordance with ASHRAE Handbook HVAC Applications, Chapter 49, "Service Water Heating," UFC 3-420-01 and amendments, and ASHRAE 189.1, Section 7.4.3. Size and place equipment so that it is easily accessible and removable for repair or replacement. All hot water systems must be electric.

6.4.4 INSIDE STORAGE

In janitor spaces, rooms, or closets, provide at minimum, a service sink with heavy duty shelf and wall hung mop and broom rack(s).

6.4.5 FLOOR DRAINS

As a minimum, provide floor drains in mechanical rooms, janitor closets, fire riser rooms, restrooms, and any other area that requires drainage from fixtures or equipment condensate, areas where water is used to clean floors, and as necessary.

6.4.6 WATER EFFICIENT PLUMBING FIXTURES

Indoor plumbing fixture equipment shall comply with the following criteria: ASHRAE 189.1, Section 6.3, Mandatory Provisions, and either Section 6.4, Prescriptive Option, or Section 6.5, Performance Option.

6.4.7 KITCHEN FAUCETS

Kitchen faucets shall have a maximum flow rate of 1.5 gallons per minute and be in accordance with ASME All2.18.1/CSA B125.1.

6.4.8 WATER CLOSETS (TOILETS)

ASHRAE 189.1, Sections 6.3.2.1.a and b. requirements for water closets (toilets) shall be as follows: Water closets (toilets)-tank-type: Tank-type water closets shall be certified to the performance criteria of the U.S. EPA WaterSense Tank-Type High Efficiency Toilet Specification and shall have a maximum flush volume of 1.28 gallons (4.8 Liters).

5.7.8.1 PUBLIC LAVATORY FAUCETS

Lavatory faucets in a public setting shall have an overall maximum flow rate of 0.35 gallon per minute and be in accordance with ASME A112.18.1/CSA B125.1.

5.7.8.2 DRAINAGE SYSTEMS

Do not use engineered vent or Sovent® type drainage systems.

5.7.8.3 PIPE LOCATION AND INSULATION

Where the seasonal design temperature of the cold water entering a building is below the seasonal design dew point of the indoor ambient air insulate plumbing piping with a vapor barrier type of insulation to prevent condensation. Do not locate water or drainage piping over electrical wiring or equipment unless adequate protection against water (including condensation) damage is provided. Insulation alone is not adequate protection against condensation. Meet pipe insulation requirements of ASHRAE 189.1, Section 7.4.3.11 and Table C-11 of Normative Appendix C.

5.7.8.4 PIPE PROTECTION DURING CONSTRUCTION

Cover all drain, waste, and vent piping to prevent mortar or other debris to enter during such construction activities.

6.5 ELECTRICAL AND COMMUNICATION SYSTEMS

6.5.1 STANDARDS AND CODES

The electrical systems for all facilities shall conform to Paragraph 4.0 Applicable Criteria.

6.5.2 MATERIALS AND EQUIPMENT

Materials, equipment, and devices shall, at a minimum, meet the requirements of Underwriters Laboratories (UL) where UL standards are established for those items. Wiring for branch circuits shall be copper. Motors larger than one-half horsepower shall be three phase.

All electrical systems shall be pre-wired and fully operational unless otherwise indicated. Wall mounted electrical devices (power receptacles, communication outlets, and cable television outlets) shall have matching colors, mounting heights, and faceplates.

6.5.3 POWER SERVICE

Primary service from the Base electrical distribution system to the pad-mounted transformer, and secondary service from the transformer to the building service electrical equipment room shall be underground. See Paragraph 6.0 for additional site electrical requirements.

Space capacity: Provide 10 percent space for future circuit breakers in all panelboards serving residential areas of buildings and minimum 15 percent spaces in all other panelboards and switchboard. The total load demand on panelboards shall not exceed 50 percent of panelboard/feeder rating.

6.5.4 TELECOMMUNICATION SERVICE

Provide conduit/pathways to connect the project's facilities to the Installation telecommunications (voice and data) system through the outside plant telecommunications underground infrastructure cabling system in accordance with the I3A Criteria. Connect to the outside plant cabling system from each facility main cross connect located in the telecommunications room.

6.5.5 LIGHTING

Comply with UFC 3-530-01 Interior and Exterior Lighting Systems and Controls, the recommendations of the Illumination Engineering Society (IES) and requirements of EPAct-2005 and Federal Energy Management Program (FEMP) for lighting products.

5.8.5.1 INTERIOR LIGHTING

A. Reflective surfaces: Lighting systems shall be coordinated with daylighting requirements, along with surfaces and colors of interior architectural spaces, so as to minimize reflected glare from those surfaces.
   1) Shall be solid-state LED lighting: Fixtures shall have a lumen maintenance life expectancy (L70) of 50,000 hours, a CRI of 80, and a CCT of 4000 K (color temperature to be verified with the Installation). Each solid-state fixture model shall be tested in accordance with IES LM-79. Test reports shall verify the fixture performance (lumen output, lumen maintenance, power consumption, efficacy, and color) meets or exceeds the fixture manufacturer's published data. Laboratory testing shall be completed by a National Voluntary Laboratory Accreditation Program laboratory. Provide outside each building emergency egress door an un-switched emergency egress luminaire that is controlled by photocell or astronomical time clock. These luminaires shall be equipped with integral battery backup and status indicator. All other emergency egress luminaires shall be controlled the same as non-emergency luminaires in a shared space during normal (non-emergency) operation. Provide a minimum 5-year warranty for these fixtures.
   2) Lighting systems and controls: Lighting systems (including lighting controls, daylighting controls, and lighting power density limits) shall comply with the requirements of Section 7.4.6 of ASHRAE Standard 189.1 and Section 9 of ANSI/ASHRAE/IES 90.1. Lighting designs shall follow the recommended practices of the IES and shall target the recommended illumination levels of the IES. Do not use occupancy sensors, vacancy sensors, or timers to control luminaires

that provide illumination of the workspace around electrical service equipment such as switchboards, panelboards. To reduce energy consumption, luminaires in the adjacent space that do not provide illumination of the workspace must be dimmable and controlled by an integrated or separate vacancy sensor. For this application, the luminaires can be dimmed a maximum of 50 percent of their full light output, but the dimmed cannot be stepped.

3) Occupancy or vacancy sensors: Use occupancy or vacancy sensors to automatically turn off lighting a specified time after all occupants leave the space. The off time shall be user adjustable to 5, 15, or 30 minutes. Selection of the sensor type (single or dual technology, wired) shall be based on the space configuration, user functionality and manufacturer's recommendations. Single technology solutions shall incorporate signal processing technology that distinguishes between background noise and actual motion without automatically changing their sensitivity.

5.8.5.2 EXTERIOR LIGHTING REQUIREMENTS

These requirements apply to exterior lighting illuminating any building, site, property, structure, gate, sign, roadway, parking lot, pathway, sidewalk, landscape, structure, etc., that is owned, operated by, or constructed to be leased to the Department of the Army. This includes all Sustainment, Restoration, and Modernization and Military Construction activities within the United States, its territories, and overseas on permanent Active Army installations, Army Reserve Centers, Army National Guard Readiness Facilities, and Armed Forces Reserve Centers, regardless of funds source. See Paragraph 6.9 for site specific information, if any, on exterior lighting systems.

A. Shall be solid-state LED lighting: Fixtures shall have a lumen maintenance life expectancy (L70) of 50,000 hours, a CRI of 70, and a CCT of 3000 K. Each solid-state fixture model shall be tested in accordance with IES LM-79. Test reports shall verify the fixture performance (lumen output, lumen maintenance, power consumption, efficacy, and color) meets or exceeds the fixture manufactures published data. Laboratory testing shall be completed by a National Voluntary Laboratory Accreditation Program laboratory.

B. General: In addition to being environmentally responsible and life cycle cost effective, exterior lighting systems shall have a balance that: minimizes energy consumption, reduces maintenance costs, and improves lighting quality on DoD installations. Exterior lighting systems or luminaires selected for use shall have demonstrated adherence to quality standards by being recognized by the DesignLights Consortium (reference e), the Energy Star Program, the FEMP, or other third-party qualifier appropriate to the technology. Manufacturers shall stand behind their products by providing a Luminaire warranty for at least 5 years or more. Design teams shall carefully consider the occupancy and purpose of the lighting requirements and incorporate energy-saving controls, sensors, and the use of bi-level fixtures to provide exterior lighting levels only as appropriate and only during the hours of night needed. Other energy-saving and lighting quality design considerations include ensuring better uniformity of lighting distribution to required levels to reduce over-lighted hotspots and control light trespass outside the area of intended coverage.

C. Exterior lighting performance by application: Exterior lighting systems shall meet, at a minimum, the better of the standards below in Table 3 or the Design Lights Consortium Product Qualification Criteria

(reference) or current Energy Star qualification or FEMP designation requirements.

D. General exterior lighting: Typically lighting to provide visibility for security and people moving along established circulation pathways through an illuminated area to or from a destination. Examples include roadways, parking lots, parking structures, sidewalks, tarmacs, service areas, and secondary exits from buildings.

E. Architectural lighting: Lighting for use where a higher quality of light is desired, such as building entrances, wall-wash luminaires, illumination of architectural or landscaping features, sculpture, displays, exhibits, flags, gates, and primary signage.

F. Exceptions: Where a non-white light color is specifically desired by aesthetic design or a color-specific functional requirement (for example, water feature lighting, entertainment, signal lights, airfield lights, and marine wildlife protection), the CRI and CCT range values indicated may not apply. Specialized lighting, such as lighting for monitoring systems designed to use non-visible spectrum light, are also exempt from the minimum CRI and CCT standards. Luminaires primarily powered by on-site renewable energy (for example, solar and/or wind) are also exempt from the requirements here.

G. Sustainability and environmental impact reduction. To meet the mercury-use reduction intent of EISA 2007 (Reference c) and other sustainability goals, lighting systems shall not contain added mercury in excess of 5 milligrams per lamp or 80 picograms per Lumen Hour. Whenever two or more viable lighting technologies are substantially equal in life-cycle cost and performance, preference shall be given to the technology with the lowest mercury content per Lumen Hour.

Table - Exterior Lighting Performance by Application.

These values represent minimum standards and do not supersede higher standards that may also be applicable or specified by design.

Application	Luminaire Efficacy (min)	CRI	CCT min/max	Lamp Life
General Exterior Lighting	85	70	3000 max	50,000
Architectural Lighting	85	80	4000 min	50,000

Units: Luminaire Efficacy (with complete fixture load including ballast/driver loads) is in lumens per watt; CRI (Color Rendering Index) is a value without units; CCT (Correlated Color Temperature) Range is in Kelvin Temperature; Minimum Lamp Life is in Rated Hours in accordance with TM-21

6.5.6 TELECOMMUNICATION SYSTEM

Contractor shall provide system that includes but is not limited to copper and fiber optic entrance cable, termination equipment, copper and fiber backbone cable, copper and fiber horizontal distribution cable, workstation outlets, racks, cable management, patch panels, labeling, conduit, cable tray, pathways, grounding, and outlet boxes for building telecommunications cabling systems (BCS) and outside plant telecommunications cabling system, that conforms to applicable criteria, including but not limited to Technical Guide for Installation Information Infrastructure Architecture I3A. Contractor shall provide outside plant infrastructure that includes, but is not limited to cable vaults, manhole and duct infrastructure, and conduit. Pine Bluff Arsenal (PBA) will provide switches and cross connects.

5.8.6.1 TESTING FOR TELECOMMUNICATION SYSTEMS
Testing will be provided by the Contractor in accordance with requirements of Technical Guide for Installation Information Infrastructure Architecture (I3A).

5.8.6.2 INSTALLATION
The installers assigned to the installation of the telecommunications system or any of its components shall be regularly and professionally engaged in the business of the application, installation of the specified telecommunications systems and equipment.

6.5.7 LIGHTNING PROTECTION SYSTEM

Provide a lightning protection system where recommended by the Lightning Risk Assessment of NFPA 780, Annex L.

6.5.8 CATHODIC PROTECTION

Provide cathodic protection in accordance with UFC3-570-01.

6.6 HEATING, VENTILATING, AND AIR CONDITIONING

6.6.1 STANDARDS AND CODES

The HVAC system shall conform to applicable criteria.

6.6.2 DESIGN CONDITIONS

5.9.2.1 LOAD CALCULATIONS REQUIREMENTS
Indoor design conditions and load calculations shall be in accordance with UFC 3-410-01. Outdoor air and exhaust ventilation requirements for indoor air quality shall be in accordance with ASHRAE 62.1. Outdoor design conditions are in UFC 3-410-01 except that weather data is specified in Paragraph 6.0, rather than at the URL (web link) listed in the UFC.

5.9.2.2 INDOOR AIR QUALITY
Buildings indoor air quality systems, thermal comfort, acoustical control, equipment, calculation procedures, construction, and start-up shall comply with ASHRAE Standard 189.1, Section 8.3, Mandatory Provisions, and Section 8.4, Prescriptive Option, and either Section 8.5, Performance Option unless otherwise specified in this subsection.

5.9.2.3 AVAILABLE UTILITIES FOR MECHANICAL SYSTEMS
All mechanical equipment must use the on-site utilities.

5.9.2.4 ENVIRONMENTAL TOBACCO SMOKE

A. Smoking shall not be allowed inside the building. Signage stating such shall be posted within 10 feet (3 meters) of each building entrance.
B. Any exterior designated smoking areas shall be located a minimum of 50 feet (7.5 meters) away from building entrances, outdoor air intakes, and operable windows.
C. Section 6.2.9 of ANSI/ASHRAE Standard 62.1 shall not apply.

5.9.2.5 HIGH HUMIDITY AREAS
Design HVAC systems in geographical areas meeting the definition for high humidity in UFC 3-410-0lFA to comply with the special criteria therein for humid areas.

5.9.2.6 CONTROLS *MAINTENANCE*
Locate all equipment so that service, adjustment, and replacement of controls or internal components are readily accessible for easy maintenance.

6.6.3 UTILITY METERS

Measurement devices with remote communication capability shall be provided to collect energy and water consumption data for each energy supply source and water supply source to each facility, including water (potable, reclaimed and rainwater), electricity, and natural gas that exceeds the thresholds listed in ASHRAE Standard 189.1. Meet the requirements of ASHRAE Standard 189.1, Sections 6.3.3, 7.3.3, 10.3.2 and AR 420-1, Chapter 22. For Government owned utilities, install meters with remote communication capability as well as have a continuous manual reading option. Water meters shall provide daily data and shall record hourly consumption. Gas and electric meters will provide demand readings based on consumption over a maximum of any 15-minute period.

5.9.3.1 DATA STORAGE AND RETRIEVAL

Configure all meters to transmit to a meter data management system at least daily even if no receiver for the data is currently available at the time of project acceptance. For privatized utilities, coordinate with the privatization utility(ies) for the proper meter base and meter installation.

5.9.3.2 ENERGY METERING

Meters with remote metering capability or automatic meter reading (AMR) capability shall be provided to collect energy use data for each supply energy source (for example, electricity) to the building that exceed thresholds of: Electrical service - > 200 kVA. Utility company service entrance/interval meters are allowed to be used provided they are configured for automatic meter reading capability. Sub-metering with remote metering capability shall be provided to collect energy use data for each subsystem component that meet the following thresholds: Packaged AC units - > 70 kW (240,000 Btu/h) cooling; Fans - > 15 kW (20 hp); Pumps - > 15 kW (20 hp); General lighting circuits - > 100 kVA; Miscellaneous electric loads - > 100 kVA).

6.6.4 BUILDING AUTOMATION SYSTEM

The facility's systems shall be controlled by BACnet based direct digital control (DOC) system utilizing Niagara framework and connected to the existing base wide utility monitoring and controls system (UMCS). Unit heater, wall heater, and split system equipment must be provided with standalone controls. Remote temperature sensors must be provided for split system equipment serving COMM rooms. Remote temperature sensors must be tied into the UMCS for monitoring and alarming purposes.

Utility meters for electric, water, and natural gas (for generator) must be monitored by the existing UMCS utilizing Tridium Niagara framework. Gas meter shall be Dresser Root IMC/W2.

6.7 ENERGY CONSERVATION

6.7.1 ENERGY EFFICIENCY

The building(s), including the envelope(s), HVAC systems, service water heating, power, and lighting systems, shall meet, at a minimum, the mandatory provisions in Section 7.3 and either the prescriptive option in Section 7.4 or the performance option in Section 7.5 of ASHRAE Standard 189.1. ASHRAE 189.1 is the minimum requirement that incorporates by reference the requirements of ASHRAE Standard 90.land shall be used as the project baseline. Substantiation requirements are defined in Section 01 33 16, Design After Award and ASHRAE Standard 189.1, Section 10.3.2.

6.7.1.1 MINIMUM ENERGY CONSUMPTION

A LCCA has already been performed for the systems described within this document and associated attachments (plans, specifications, etc.).

6.7.2 ENERGY STAR AND FEMP PRODUCTS

The HVAC system shall comply with Section 6 of ANSI/ASHRAE/IESNA 90.1and Section 7.4.2.1.b of ASHRAE Standard 189.1, including the Normative Appendix C of ASHRAE Standard 189.1 with the following modification:

Purchase Energy Star products, except use FEMP designated products where FEMP is applicable to the product type. The term Energy Star means a product that is rated for energy efficiency under an Energy Star program. The term FEMP designated means a product that is designated under the Federal Energy Management Program of the Department of Energy as being among the highest 25 percent of equivalent products for energy efficiency.

6.7.3 FUNDAMENTAL REFRIGERANT MANAGEMENT

Meet the requirements of ASHRAE Standard 15.

6.8 FIRE PROTECTION

6.8.1 STANDARDS AND CODES

The Design Build Contractor will provide the fire protection system conforming to applicable criteria.

6.8.2 INSPECTION AND TESTING

The Design Build Contractor and subcontractors will inspect and test all fire suppression equipment in accordance with the applicable NFPA standards. The fire protection engineer of record shall witness final tests. The fire protection engineer of record shall certify that the equipment and systems are fully operational and meet the contract requirements. Two weeks prior to each final test, the Contractor shall notify, in writing, the Installation fire department and the Installation public work representative of the test and invite them to witness the test.

6.8.3 FIRE EXTINGUISHERS AND CABINETS

The Design Build Contractor will provide and install all fire extinguishers, fire extinguisher brackets and cabinets in accordance with NFPA 10 Standard for Portable Fire Extinguishers.

6.8.4 FIRE PROTECTION ENGINEER QUALIFICATIONS

The Design Build Contractor shall provide the services of a Qualified Fire Protection Engineer (QFPE) as required by UFC 3-600-01. The QFPE shall be involved in every aspect of the design, construction, and commissioning in this project as it relates to fire protection engineering and life safety. The QFPE shall be directly hired by the DB Contractor as an integral part of the DB Contractor's design team for identifying and incorporating all of the fire protection and life-safety requirements for this project.

In accordance with UFC 3-600-01, Fire Protection Engineering for Facilities, the fire protection engineer of record shall be a registered Professional Engineer in the State of Arkansas who has passed the fire protection engineering written examination administered by the National Council of Examiners for Engineering and Surveys (NCEES), or a registered Professional Engineer in the State of Arkansas in a related engineering discipline with a minimum of 5 years of experience, dedicated to fire protection engineering that can be verified with documentation.

The QFPE shall be in responsible charge of the life-safety plans and accompanying building code analysis. Construction (shop) drawings and calculations for fire extinguishing systems must be prepared in accordance with UFC 3-600-01. Construction (shop) drawings and calculations for fire alarm and Mass Notification systems must be prepared in accordance with UFC 3-600-01.

The Design Build Contractor shall develop and provide an addressable fire alarm and Mass Notification System compatible with the existing base wide fire alarm system.

Interior spaces served by fire alarm and voice evacuation systems, shall comply with UFC and UFGS for speech intelligibility. A UL-listed firestopping system shall be used for conduits or cables that pass through vertical separations. Panels (including but not limited to fire alarm control panel [FACP], annunciator [ANN], and notification appliance circuit [NAC]) shall not be installed above 6 feet on walls, and a 3-foot clearance shall be maintained around components.

Pathway Survivability Level 1 shall be provided for pathways. Pathways for initiating device circuits (IDCs), signaling line circuits (SLCs), and NACs shall comply with a Class B pathway class designation and provide requisite circuit supervision. All pathways for communications between building fire alarm control units shall be Class X pathway class. Fire alarm wiring must be installed in metal raceway separate from all other systems. Manual pull stations shall be located by each exit.

Notification appliances shall consist of clear strobe visual notification appliances marked with the word "ALERT" for indication of fire alarm signals. Use of "ALERT" markings is not allowed on the fire alarm devices, and is reserved for other life-safety systems (such as MNS), where installed. Audible notification appliances shall use speakers for both fire alarm and voice messaging purposes.

Spare parts shall include 2 percent or a minimum of two of each type of devices used in the system (examples include but not limited to: bases, modules, detectors, pull stations, speaker-strobes, magnetic door holders, or similar such components). For software-based systems, a record copy of the site-specific software shall be delivered to fire alarm technicians at the installation after all changes have been made for acceptance testing.

The fire alarm system shall be fully tested to ensure that equipment and components function as intended. Tests shall be witnessed and approved by the QFPE and shall include testing in accordance with ANSI/ASA S3.5, "American National Standard Methods for Calculation of the Speech Intelligibility Index," to provide a Common Intelligibility Scale value for all common spaces. Upon completion of specified tests, the DB contractor shall complete and submit the Contractor's Certificate of Completion. The extent of the renovations may require a recertification of the entire buildings fire alarm / MNS systems to be witness by Base Fire Department.

The Design Build Contractor shall develop and provide a complete automatic sprinkler protection system in accordance with UFC 3-600-01, NFPA 13, and other applicable codes and standards.

The Design Build Contractor will conduct a fire flow test, witnessed by the QFPE, and prepare preliminary hydraulic calculations to determine the most efficient supply pipe routing and if a fire pump (psi) or additional fire protection water (flow) is required.

The Design Build Contractor, via the above noted flow test hydraulic analysis, will determine if a fire pump and or above ground supplemental water storage is required and included in the design.

6.9 SUSTAINABLE DESIGN

6.9.1 STANDARDS

Sustainable design shall conform to applicable criteria. Each building must individually comply with the requirements of paragraphs Energy Conservation and Plumbing And Water Consuming Equipment. The project must earn the points associated with compliance with Paragraph 5.10. Projects are required to perform sustainability and document using the current version of the U.S. Army Energy and Sustainability Record Card.

6.9.2 CONSTRUCTION WASTE MANAGEMENT

A minimum of 60 percent of nonhazardous construction and demolition waste material generated prior to the issuance of the final certificate of occupancy shall be diverted from disposal in landfills and incinerators by recycling and/or reuse. Reuse includes donation of materials to charitable organization, salvage of existing materials onsite, and packaging materials returned to the manufacturer, shipper, or other source that will reuse the packaging in future shipments. Excavated soil and land clearing debris shall not be included in the calculation. Calculations are allowed to be done by either weight or volume, but shall be consistent throughout. Specific area(s) on the construction site shall be designated for collection of recyclable and reusable materials. Off-site storage and sorting of materials shall be allowed. Diversion efforts shall be tracked throughout the construction process

6.10 SECURITY (ANTITERRORISM STANDARDS)

Unless otherwise specified in project specific requirements, only the minimum protective measures as specified by the current Department of Defense Minimum Antiterrorism Standards for Buildings, UFC 4-010-01, are required for this project. In addition to the UFC cited in this paragraph, UFC 4-020-01 "DoD Security Engineering Facilities Planning Manualn; UFC 4- 021-02 "Electronic Security Systemsn; and UFC 4-021-01 "Design and O&M Mass Notification Systemsn apply to the facility.

6.11 CYBERSECURITY

6.11.1 STANDARDS

The cybersecurity design for all Facility Related Control Systems (FRCS) incorporated within the project must align with the requirements of UFC 4-010-06, Cybersecurity of Facility Related Control Systems.

6.0 PROJECT SPECIFIC REQUIREMENTS

6.1 GENERAL

The requirements of this paragraph augment the requirements indicated in Paragraphs 3.0 through 5.0.

6.2 APPROVED DEVIATIONS

There are no approved deviations from the requirements stated in Paragraphs 3.0 through 5.0 that apply to this project.

6.3 SITE PLANNING AND DESIGN

The site work consists of all aspects of a complete project site. This includes site planning and layout, demolition, design of grading, storm drainage, roads, traffic signals, parking, fencing and barriers, utilities and utility relocation, signage, landscaping, AT/FP, stormwater management and erosion and sediment control, and obtaining necessary permits. An Access Control Point Study conducted in 2018 by the Military Surface Deployment and Distribution Command, Transportation Engineering Agency, determined that the Plainview Access Control Point requires two new entrance access lanes and one exit access lane with a commercial inspection point to provide secure and efficient traffic flow. The purpose of the Study was to assess existing conditions and to identify short-term and long-term transportation needs to safely provide for existing and future transportation demands. Select portions of the Traffic Study are included in Appendix H for information only. In addition, prior to design of this project, a team from USACE Little Rock and USACE Fort Worth Districts, in conjunction with PBA, completed a planning charrette with conceptual level design report and plans for the Plainview Gate ACP. Two DD 1391s from the conceptual design are provided for information only in Appendix M. The concept level site layout plans were further developed from the concept design report, and the selected drawings are included in Appendix A. The conceptual layout for the PBA ACP has been approved by the COS for ACPs, so any substantial deviations must be approved in writing by the COS. The Contractor shall be responsible for any and all delays associated with approval for substantial deviations.

6.3.1 EXISTING SITE DESCRIPTION

The project is located on Pine Bluff Arsenal, White Hall, Arkansas, at the intersection of Hoadley Road and Dayton Road. The new ACP will be sited south of existing Plainview gate.

The site for the new ACP is currently heavily wooded, approximately 11 acres in size. This area was formerly used as a staging area for the contractors. There are railroad tracks (which is owned by PBA) on the west end of the proposed site. Government ownership of the road starts approximately 580 feet from the west end of the overpass where E. Baldwin Road intersects E. Hoadley Road/State Highway 256. E. Hoadley Road/State Highway 256 continues west, crossing State Highway 365, and then terminating at Interstate 530 (US Hwy 65). The project area generally slopes to the southwest. Utilities are present on or near the site for all required utility improvements (see Section 6.4 for additional information).

6.3.2 GENERAL SITE DESIGN AND LAYOUT GUIDELINES

The site layout for the ACP has been conceptually designed by the Government as described in Paragraph 6.3. The Contractor shall complete the design of the fully compliant ACP, including all roads, buildings, barriers, and utilities, in accordance with the provided layout and the ACP Standard drawings. The design shall include two inbound lanes at the ID check area, one entrance lane past the ID check area, and one exit lane. The design shall also include one inbound lane and two outbound lanes at the truck search area. The final design shall incorporate all site and ACP features described in Section 3.0 and shown in Appendix A, and shall consider aesthetics, optimum drainage, balance of earthwork (cuts and fills), stormwater management, environmental/sustainability concerns, safety, utilities, and convenience for vehicles.

6.3.3 TRAFFIC PERFORMANCE AND DESIGN CRITERIA

The Contractor shall be responsible for the design and construction of the Project signing, pavement markings, and roadway and sign lighting. The Contractor is responsible for coordinating all Traffic Control Devices, including signing and lighting, with all other disciplines involved with the project.

The Contractor shall ensure the roadway features, including traffic control devices, properly advise motorists of the approaching gate and ACP. This may include, but is not limited to, the following:

A. Design the roadway to tie the grades from existing to proposed and add right turn lane for trucks before the entry point.

B. Bracket all approach signing.

C. Thermoplastic pavement markings.

D. Gate closure signing with Type III barricades.

E. Flashing warning devices on the approach signs and/or closure gate.

F. Ground mounted signing in addition to that shown in ACP-SDC and SDDC-TEA Pamphlet 55-15.

G. Speed limit reduction signing.

The Contractor shall prepare Signing and pavement marking plans for all phases of construction (including temporary traffic shifts, detours, etc.) in coordination with PBA and Arkansas Department of Transportation (ARDOT). Traffic control devices shall comply with Arkansas law, regulation, and policy.

Use the most current adopted version of each listed standard as of the publication date of this RFP. Should the requirements listed in Paragraph 4.0 of this Statement of Work conflict with those State requirements listed above, the State requirements shall govern. It is the Contractor's responsibility to obtain clarification for any unresolved or perceived ambiguity prior to proceeding with design or construction.

Roadway lighting shall be provided within the project limits as discussed in the Electrical section narratives.

6.3.4 ROADWAYS

Roadway design shall be in accordance with AASHTO Green Book.

Provide AASHTO Manual for Assessing Safety Hardware (MASH) compliant attenuators at ID check and truck search islands to provide protection against errant impact as shown in Appendix A.

6.3.4.1 VEHICULAR CIRCULATION

Turning movement calculations/modeling shall be performed to confirm that the correct vehicle turning radius is achieved and to demonstrate there is no conflict with other vehicles in the ACP corridor. Turning movement analysis shall address all traffic types to be processed. The turning movement calculations/models shall be provided for all turning movements. The turning movement analysis shall be performed for all anticipated vehicle paths. The turning movement analysis shall include, but not be limited to: horizontal road alignment, turnaround and rejection, entrance and egress paths for the ACP corridor, and search areas.

6.3.4.2 DESIGN SPEED

Design speed of the approach and response zones shall be 25 miles per hour.

6.3.5 PARKING

Provide a minimum of 20 parking stalls (inclusive of ABA spaces) at the VCC. The VCC parking lot must have at least 2 vehicle entrances/exits for vehicle circulation. Provide a minimum of 5 security forces parking stalls and 1 chase vehicle stall at the gatehouse.

6.3.6 BARRIERS

6.3.6. 1 ACTIVE VEHICLE BARRIERS

The AVBs shall be selected from the DoD Anti-Ram Vehicle Barrier List available on the USACE Protective Design Center website: https://pdc.usace.army.mil/library/BarrierCertification/

The AVBs selected shall operate in all seasons and be compatible with the project location's climate.

AVBs, AVB control system, and traffic signals shall be designed, constructed, and tested in accordance with the Army ACP-SDC and UFGS 34 71 13.16 "Vehicle Crash Barriers". The AVB safety system employed must be an SDDC-TEA approved safety scheme which is recommended for use by the SDDC-TEA for the peak hour volumes of E. Hoadly Road. The developed preliminary threat computations, in accordance with ACP-SDC, to locate the AVBs are included in Appendix D. The Contractor shall develop the final threat computations with the final design and shall submit them to the COS for review and approval prior to construction. Final design drawings shall be designed by the Contractor showing the detailed configuration and interface between AVBs, passive barriers, stop lines, overhead signals, lighting, safety loops, and overwatch position, among other elements. Ensure that grading plans direct storm runoff away from the AVBs.

6.3.6.2 PASSIVE VEHICLE BARRIERS AND FENCING

Design and construct a passive vehicle barrier system in accordance with Army ACP-SDC and UFC 4-022-02, to channel vehicle threats from the ACP entrance to the AVBs. The Contractor must provide detailed calculations showing that the passive barriers will contain all required vehicle threats at maximum approach speeds; the calculations must be submitted to the COS for review and approval. The completely edited guide specification for each product is required as part of the Contractor's design submittals. Where perimeter fencing is required, provide FE-6 chain link fencing with 7-foot fabric height and meeting the requirements of UFC 4-022-03 and Installation requirements. The general locations of required passive barriers and perimeter fencing are shown on the site plan in Appendix A; final details and locations shall be designed by the Contractor.

Provide double swing vehicular gates at the locations shown in Appendix A and meeting the requirements of UFC 4-022-03. Provide MASH compliant attenuators for gate posts within the clear zone as defined in the AASHTO Roadside Design Guide. Provide a MASH compliant attenuator for gate posts in the center median to provide protection for westbound traffic.

6.3.7 LANDSCAPING

The landscape design for this project will include but is not limited to, evaluating site conditions, reviewing existing landscaping, and incorporating customer recommendations to develop a comprehensive plan to include specifications, drawings (plant schedule, planting notes and details). The

Contractor shall provide landscaping for the project consisting of, but not limited to, new Turf (temporary and permanent seeding), a new plant layout (consisting of but not limited to, trees, shrubs, perennials, ornamental grasses, and groundcover), and Installation requirements. Landscape plantings provided shall not obstruct vehicular lines of sight. Refer to AASHTO "A Policy on Geometric Design of Highways and Streets." Landscape shall be designed in accordance with UFC 3-201-02, MOE ESD, PBA Installation Design Guide, and other applicable physical security guidelines.

Proposed plantings, planting locations, etc. shall not interfere with the views of security personnel in the performance of their work duties and shall be in accordance with applicable AT/FP guidelines for placement of plant material.

Reference UFC 4-010-01 DoD Minimum Antiterrorism Standards for Buildings. Plant locations shall be coordinated with utilities, take mature size of plant species into consideration, and enhance the appearance of stormwater management features. Selection of plant material shall take seasonal interest and maintenance requirements into consideration. Turf seed shall be provided for all disturbed and bare areas that are not paved or otherwise landscaped. A variety of new plant materials shall be used to create a well-balanced, cohesive, and pleasing environment that will be long lasting, require little maintenance, and blend with the existing landscape and surroundings. Plant selection shall place priority on species with four season interest that will enhance and promote a positive image for Pine Bluff Arsenal year-round. Emphasis will be placed on creating attractive and functional entry points to the project and on screening inspections procedures from public view. Use of plant material promotes sustainability and provides aesthetic appeal as well as preservation of fauna and flora, energy conservation, climate modification, erosion control, air/water purification, and noise abatement. Plant species shall be native, hardy, and well-adapted to help reduce maintenance and irrigation requirements. Species shall be drought resistant and require no irrigation after establishment period, and comply with applicable AT/FP requirements. Recommend grouping of plants of similar water requirements together and use of plant materials for screening of unsightly elements and vehicle search areas. Tree planting locations shall be coordinated with utilities to avoid conflicts now and in the future. All plant material shall be specimen quality. Quality and size of plants shall conform to the most recent addition of the "American Standards for Nursery Stock", American Association of Nurserymen. Planting or sodding shall occur only during periods when beneficial results can be obtained. Plant material shall be updated to reflect new and approved cultivars that are hardier and more pest and disease resistant. Trees shall be staked that are equal to or larger than 2 inches in caliper and for trees on slopes. Other trees need not be staked.

6.3.7. 1 MAINTENANCE AND GUARANTEE (PLANT MATERIAL)

Maintenance of plant materials shall commence immediately after each plant is installed and shall continue through the length of the guarantee. The Design-Build Contractor shall provide maintenance in accordance with the requirements of the plant supplier. Initial size of plant stock is to conform to any AT/FP and site security requirements. Minimum topsoil requirements for plant material shall be the same that is required for sodding. The Design-Build Contractor shall provide a one-year (365 day) warranty, commencing at final project completion, on all installed plant material and warranty information shall be included in the project specifications. All new plants furnished for this project shall have an establishment period to commence on

the date that inspection shows that the furnished plants have been satisfactorily installed. Maintenance and care shall begin immediately after new plants have been installed and shall continue through the length of the guarantee. The establishment period shall continue for a minimum period of 1 year for all new plants after final project completion. During the 1 year establishment period, the Contractor shall maintain a schedule of planting maintenance which shall be approved by the COR, and shall include regular watering of new plantings. Regular watering is required and shall be performed on a consistent basis to ensure successful establishment of plant material. Allowing plant material to die from lack of regular watering because it is cheaper to replace dead plant(s) at end of warranty period is unacceptable. A minimum 1 year guarantee shall be indicated so that any new plants that have died (or have grown in a manner uncharacteristic of its type) within the 1 year establishment period shall be replaced at the Contractor's expense. Within 10 days prior to date of final acceptance, the Contractor shall remulch all mulched areas; remove invasive/weeds/perform edging and trimming of all planted areas; and perform tree support adjustments as needed. Plants are judged on the vigor, structure, and new growth on the plants. New growth shall be present in 85 percent of the plants. A maintenance manual shall be provided for the user to document the watering, fertilizing, mulching, weeding, and pruning requirements for the care of all new plantings.

6.3.7.2 TURF

All turf materials and installation shall be provided in accordance with the PBA Installation Design Guide and with the Guide Specifications. All disturbed areas not paved or otherwise landscaped shall be permanently vegetated with permanent seeding unless indicated otherwise. Seed shall be in accordance with the seed mixes in the PBA Installation Design Guide. The Permanent Seeding Tables on the Erosion and Sediment control drawings and/or the specifications can be used to indicate the species, seed mixture by weight (shown as percentage), application rates, seeding dates, seeding depths etc. required for the project. Do not plant seed when the ground is frozen, snow covered, muddy, or when air temperature exceeds 90 degrees Fahrenheit. Turf selections shall be updated to reflect new and approved cultivars that are hardier and more pest and disease resistant. Turf/Groundcover of an invasive nature shall not be used within 10 feet of shrub and groundcover beds. Provisions for soil stabilization accessories such as netting, blankets, and stabilizer mats shall be provided if the need arises. An acceptable stand for turf, as a minimum requirement, is a solid vegetative cover with no gaps with 95 percent coverage. For turf/groundcover, a guarantee shall be provided a minimum of 365 days.

6.3.7.3 MAINTENANCE AND GUARANTEE (TURF)

Maintenance and care of turf shall begin immediately after new turf has been established and shall continue through the length of the guarantee. The Design-Build Contractor shall provide maintenance in accordance with the requirements of the seed supplier. Topsoil requirements are shown below. The establishment period shall continue for a minimum period of 1 year after date of final project completion. During the 1-year establishment period, the Contractor shall maintain a schedule of planting maintenance which shall be approved by the COR, and shall include regular watering of new plantings. Regular watering is required and shall be performed on a consistent basis to ensure successful establishment of turf. Allowing turf to die from lack of regular watering because it is cheaper to replace turf at end of warranty period is unacceptable. Turf shall be guaranteed for 365 days beginning on the date final project completion to commence the establishment period,

against defects including death and unsatisfactory growth, except for defects resulting from lack of adequate maintenance, neglect, or abuse by the Government or by weather conditions unusual for the warranty period. Warranty information shall be included in the project specifications.

A minimum 1-year guarantee (from project acceptance) shall be indicated so that any turf that has died (or has grown in a manner uncharacteristic of its type) within the 1-year establishment period shall be replaced at the Contractor's expense. Remove and replace dead turf and fill in bare spots immediately unless required to plant in the succeeding planting season. At end of warranty period, replace areas that are dead or are not 95 percent viable/healthy.

6.3.7.4 TOPSOIL

The topsoil (existing on-site topsoil and imported topsoil) shall be tested and modified as necessary to ensure soil and drainage conditions detrimental to plant growth are identified and corrected. Topsoil shall be a minimum 4-inch depth and spread throughout all turf areas. Topsoil shall be fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, and free of sticks, subsoil, stones, clay or impurities, plants, weeds and roots and other debris and objectionable materials over 0.25 inch diameter. pH value shall be between 5.5 and 7.5 and organic content shall be 7 to 10 percent. Topsoil shall be as specified in specifications and shall be reused from the site as much as possible. If the stored site's topsoil is insufficient or not appropriate for the landscaping needs, additional topsoil (that meets specifications) shall be provided by the Contractor from an off-site source approved by the COR.

6.3.8 ENVIRONMENTAL PERMITS AND APPROVALS

The Contractor is responsible for obtaining all necessary permits prior to the start of any construction activity including Erosion and Sediment Control, Storm Water Management, and National Pollutant Discharge Elimination System (NPDES) for any disturbance greater than 5,000 square feet. The Contractor is responsible for all permit and expeditor fees. Identification and responsibility for obtaining all applicable stormwater management permits shall be in accordance with Specification Section 01 33 16 Design After Award.

6.3.8. 1 STORMWATER MANAGEMENT

Stormwater management (SWM) systems shall be designed in accordance with the Arkansas Department of Energy and Environment regulations. Compliance with the Energy Security and Independence Act Section 438 and UFC 3-210-10 Low Impact Development is also required. The SWM design shall incorporate strategies including a combination of structural practices, standards, and specifications that are appropriate for the site. The design shall consider long-term operation and maintenance of BMPs that shall have the approval of PBA. Water quality protection shall be provided in accordance with the Federal Water Pollution Control Act.

6.3.8.2 EROSION AND SEDIMENT CONTROL

All sediment and erosion control measures shall be designed accordance with the UFC and Arkansas Department of Energy and Environment regulations. Place all erosion and sedimentation control notes, directions, details, certification signatures, etc., on the design drawings. All erosion and sediment control measures shall be designed to control point source pollution in accordance with the National Pollution Discharge Elimination System,

Section 438 of the Energy Independence and Security Act, and all other applicable MOE requirements

6.3.8.3 NATIONAL POLLUTION DISCHARGE ELIMINATION

The Contractor is responsible for paying the NPDES review fees. A Stormwater General Permit for Construction Activities shall be obtained from the Arkansas Department of Energy and Environment prior to filing a Notice of Intent (NOI) to discharge under this general permit

6.4 SITE ENGINEERING

6.4.1 SURVEY AND MAPPING

Mapping of the PBA ACP project site, obtained from field surveys and GIS mapping is shown for information only in Appendix A. These sheets include utility data and topography. A digital file of all available mapping is available in AutoCAD Release 2026.

The design build Contractor shall perform topographic surveys as well as any additional mapping needed. The topographic survey shall be performed by a licensed surveyor in the State of Arkansas. Survey shall be a minimum of third order accuracy and be able to map 1-foot contours with an accuracy of ±0.5feet. Survey and mapping shall comply with all applicable sections of the National Map Accuracy Standard and FGCC Geometric Accuracy Standards and Specifications for using GPS Relative Positioning Techniques. The survey shall be performed in accordance with USACE EM 1110-1-1002, Survey Markers and Monumentation; USACE EM 1110-1-1003, NAVSTAR Global Positioning System Surveying; USACE EM 1110-1-1005, Topographic Surveying. The survey shall be tied to horizontal and vertical control. All locations and elevations of existing utilities shall be verified by test pitting prior to commencing site work. Test pits shall also be performed at new utility connection points and at the intersection of new utility runs with existing lines that remain in service.

6.4.2 PAVEMENT DESIGN

Design procedures and materials shall conform to ARDOT standards and UFC. The minimum flexible pavement sections shall be the existing pavement section of Hoadley Road or as required by the pavement design, whichever is greater. The design build Contractor shall calculate ESAL's required for pavement design in coordination with PBA and ARDOT. Traffic data is provided for information only in Appendix H (GannetFleming ACP Study). There will be no separate payment for the cost of additional data collection or traffic analysis.

6.4.3 CONSTRUCTION PHASING, MAINTENANCE OF TRAFFIC, STAGING, AND CONTRACTOR ACCESS

6.4.3.1 CONSTRUCTION PHASING, AND MAINTENANCE OF TRAFFIC

Maintenance of Traffic General Requirements

The Contractor shall develop and implement a Transportation Management Plan (TMP) in accordance with the requirements of this statement of work, including performance requirements, standards and references, design and construction criteria, maintenance during construction, and required reviews.

Closure of the existing gate on Hoadley Road shall be fully coordinated with the PBA and USACE, and there is no guarantee that the gate will be closed or for any specific duration. The Contractor must assume the gate will remain open throughout the project. If closure is deemed necessary, it must be coordinated well in advance with all relevant parties. Any proposed road closure must be included in the TMP and requires review and approval from the

PBA, ARDOT, and the COR. The construction phasing plan provided in Appendix A is for information only.

Maintenance of Traffic Guidelines and References

The Contractor shall design and implement maintenance of traffic set-ups in accordance with the relevant requirements of the standards listed in Paragraph 6.3.3 and Paragraph 4.0 unless otherwise stipulated in this specification. Standards specifically cited in the body of this statement of work establish requirements that shall have precedence over all others. It shall be the Contractor's responsibility to obtain clarification for any unresolved or perceived ambiguity prior to proceeding with design or construction.

6.4.3.2 STAGING AREAS

The Contractor staging area(s) (consisting of Contractor temporary trailers, material storage, and Contractor parking) shall be coordinated with and approved by the COR. Utilities connections are the responsibility of the Contractor to locate and establish connections in coordination with the utility owner(s) and are not guaranteed to exist within proximity. Staging areas shown for information only in Appendix A. Security of the site is the Contractor's responsibility and fencing (permanent and/or temporary) shall be installed at his discretion within the project limits or portions thereof. Any areas disturbed by the Contractor's staging areas not part of the new development shall be stabilized against erosion and restored back to original condition prior to completion of the project in accordance with Pennsylvania Department of Environmental Protection requirements. Any pavement areas damaged during construction will be repaired at the Contractor's expense. Staging of equipment, soil stockpile, and other material shall not be placed within 5 feet from any existing tree drip line.

6.4.3.3 CONSTRUCTION ACCESS

The Contractors' access to the staging areas and project site shall be coordinated with and approved by the COR. The Contractor shall be responsible for securing and controlling site access for employees and subcontractors. Access points may include accessing through the existing gate at Hoadley Road. A temporary road showing access to the site is shown for information only in Appendix A. The contractor is required to coordinate with PBA and Little Rock District regarding the use of separate construction access routes and the designated construction bubble. While these arrangements are permitted, the contractor must verify the details with PBA to ensure compliance and confirm that all access and boundaries are acceptable.

The Contractor shall prepare, submit, implement, and maintain a detour and temporary access plan as necessary to support construction activities and maintain safe, continuous access whenever the main gate or affected intersections, including Dayton and Hoadley, are closed or restricted. Where feasible, provide a construction access area outside the secure perimeter to minimize entry through the main installation. Provide temporary access routes, fencing, gates, detours, and traffic control measures as required to maintain access to the National Guard/Reserve Center and other affected facilities for Contractor personnel, installation personnel, and authorized visitors. Include traffic rerouting measures, including rerouting along Hoadley Road and use of B Street, E Street, or other alternate routes when approved. Coordinate all proposed temporary roads, access modifications, rerouting measures, and traffic control requirements with Pine Bluff Arsenal (PBA), and submit proposed detour and access plans for review before implementation.

6.4.4 DEMOLITION

The Contractor shall remove all buildings, pavement, utilities, and other site features as required to design and construct the project features described herein. The Contractor shall be responsible as part of the design to prepare the demolished site for construction of new site features or to backfill turf areas with proper grading and drainage.

Take necessary precautions to avoid damage to existing items, to remain in place, to be reused, or to remain the property of the Government. Repair or replace damaged items as approved by the COR. Coordinate the work of this section with all other work indicated. Protect existing work that is to remain in place, be reused, or salvaged back to the Government, repair all items that are damaged during construction to their original condition, or replace with new. Demolition plans is shown for information only in Appendix A. A HAZMAT survey report for buildings is shown in Appendix C. Coordinate with PBA on demolition of existing pavements, trees, and structures.

Except for salvaged items, and for materials or equipment scheduled for salvage, all materials and equipment removed and not reused or salvaged, shall become the property of the Contractor and shall be removed from Government property. Title to materials resulting from demolition, and materials and equipment to be removed, is vested in the Contractor upon approval by the COR of the Contractor's demolition and removal procedures, and authorization by the COR to begin demolition and deconstruction. The Government will not be responsible for the condition or loss of, or damage to, such property after contract award. Showing for sale or selling materials and equipment on site is prohibited.

6.4.4.1 BUILDINGS

There are 5 existing buildings (24-010, 24-020, 24-030, 24-040, 24-021) that need to be demolished as part of the project. The as-builts for the existing buildings are included in Appendix Q. A HAZMAT survey conducted on these buildings is included in Appendix C. The HAZMAT data provided is limited, and the DB Contractor shall determine the full extent of hazardous materials present in the buildings and within the project area. The existing guardhouse (24-020) and canopy (24-021) must remain operational throughout the construction period until new facility is fully functional. Additionally, to accommodate the proposed site alignment, the AGFC Game Check Station Building (24-560) will need to be demolished as part of the site layout process, in addition to the five (5) buildings.

6.4.4.2 PAVEMENT

The Contractor shall remove and salvage existing pavement to depths required in accordance with design to construct new roadways. Provide neat saw-cuts at limits of pavement removal; protect saw-cuts so that new pavement will butt against the existing without feathering. Pavements to remain shall be protected and not overloaded.

6.4.4.3 UTILITIES

All existing utilities to remain on the site shall be protected during the demolition and construction process. Any damage shall be immediately repaired in accordance with the utility owner's requirements at the Contractor's expense. Utilities interfering with new construction shall be relocated. Maintaining uninterrupted utility service during construction shall be necessary and will be coordinated with and approved by PBA and COR. Utility lines not in use shall be completely removed to the project limits or capped at the main distribution. They shall be terminated in accordance with the

requirements of the utility owner, state and local rules and regulations, and UFC 3-201-01. See the electrical portion of the RFP for their respective demolition requirements. A detailed demolition plan shall be developed and submitted in accordance with UFC 3-201-01 and the Guide Specifications.

6.4.4.3.1 ELECTRICAL:

All existing electrical services, electrical equipment and control system from existing Gate House, ID check booth and any associated electrical ancillary devices shall be demolished back to source to accommodate for new ACP facilities and the site area. All existing site lighting located within project boundary shall be demolished. All associated lighting circuits and control system shall be demolished back to power source. Underground conduits shall be capped and abandoned in place. Existing grounding/bonding system shall be demolished and disposed of.

6.4.4.4 DISPOSAL AND SALVAGED MATERIALS

Materials to be salvaged shall be removed by the Contractor and delivered to a designated location on Post at the Contractor's expense and responsibility and are to remain the property of the Government.

6.4.4.5 DUST AND DEBRIS CONTROL

Prevent the spread of dust and debris to occupied portions of buildings or on pavements and avoid the creation of a nuisance or hazard in the surrounding area. Do not use water for dust control if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution. Sweep pavements as often as necessary to control the spread of debris.

6.4.5 BORROW AND SPOILS

Stockpiled topsoil shall be reused on this project site wherever practical. The source of borrow material shall be the Contractor's responsibility. The Contractor shall obtain from the owners the right to procure material, shall pay all royalties and other charges involved, and shall bear all the expense of developing the sources, including rights-of-way for hauling. A clean certificate (ensuring that soils imported do not contain any hazardous constituents) is required for all soils imported from off of Government lands. At a minimum, the clean certificate shall include testing for Total Petroleum Hydrocarbons (TPH), Benzene, Toluene, Ethyl Benzene, and Xylene (BTEX), and full Toxicity Characteristic Leaching Procedure (TCLP) parameters, including ignitability, corrosivity, and reactivity. Backfill soils shall meet applicable State and EPA criteria, contain no more than 10 parts per million (ppm) TPH, no more than 10 ppm total BTEX, and pass TCLP. Perform hazardous waste characteristic testing and PCB testing in accordance with accepted standard methods. Additional requirements for borrow materials shall be responsibility of DOR. Borrow material shall be compatible with existing satisfactory material. Any surplus satisfactory materials not required for fill shall be removed from the project site and stockpiled at a designated location on post at the Contractor's expense and responsibility. On-site materials shall not be used for fill or backfill; all fill and backfill material shall be imported from off site. In addition, all borrow or excavated soil originating from PBA property shall remain on site unless determined to be contaminated. Unsatisfactory materials shall be also be disposed of by the Contractor at his own expense and responsibility at a designated location on Post. All excavated material must be transported to and disposed of at the designated site specified by PBA environmental division, located at the base.

6.4.6 GRADING

Positive drainage shall be provided for all areas, and existing drainage ways shall be used to the extent possible. Building finished floor elevations shall be set to ensure that the required minimum and maximum grades are met, and shall be set 6 to 8 inches above exterior finished grades except at doors. Swales between buildings and roadways shall be avoided, if possible, unless utilized for Stormwater Management Credit. The Contractor will grade the site such that all stormwater management BMPs are functional and in accordance with Arkansas Department of Environmental Protection requirements and UFC criteria. Earthwork shall be balanced to the extent possible without compromising the design. For pavement and hardstand areas, follow good engineering practice and all applicable guidelines including AASHTO and ARDOT.

6.4.7 UTILITIES

The Contractor is alerted to the presence of overhead and underground utilities including, but not limited to, water, sanitary sewer, electric, communications, utility conduit, and poles that are located within the limits of the construction project. It is the responsibility of the Contractor to avoid, protect, coordinate and relocate these utilities as necessary to maintain service, safety and project schedule with minimal disruption to the traveling public or utility customers.

All the utilities within the base are owned, operated, and maintained by PBA. Utility plans are provided for information only in Appendix A. The Contractor is responsible to coordinate with these utilities on the overall project design, schedule and construction. As it is unknown how a Contractor will perform certain operations or how much space will be needed to perform those operations, the relocations will be based on the PBA and utilities safety and clearance requirements. It may be necessary for the Contractor to utilize non-typical methods in some cases to avoid impacting utility facilities. Associated costs will be incidental to the overall contract lump sum.

The Contractor shall incorporate and make provisions in the design for all existing and proposed utilities, including relocations. The Contractor shall establish and maintain ongoing coordination with utility owners/PBA after initial contact has been made by the USACE to fulfill the following requirements:

A. Obtain plans from the utility companies/PBA.
B. Assure adequate protection of all utilities.
C. Maintain utility service at all times during construction of the project.
D. Identify all potential conflict areas both overhead and underground and perform test pits to verify conflicts.
E. Incorporate and accommodate utility relocations in the schedule and sequence of construction.
F. Conduct alternative studies to avoid utility relocation.
G. All costs associated with additional utility relocations caused by changes to the design will be incurred by the Contractor and not the USACE. Additional utility relocations will be coordinated with the utility company/PBA and the COR.
H. Incorporate utility relocations in the schedule and sequence of construction.

Provide the construction associated with any utility service connections to existing and proposed Traffic Control Devices. The Contractor shall be

responsible for all conduits, manholes, cabling, meter cans, and disconnect switches as required by the utility to obtain the electrical utility connection. Monthly energy use charges and the final connection fees will be the responsibility of the Contractor.

Design of new storm drains, water, and sanitary utilities are addressed in the proceeding sections. Other utilities are addressed in the electrical chapter. As an aid to the designer, copies of the site survey and utility plan mapping are included for information only in Appendix A.

6.4.7.1 STORM DRAINAGE

The Contractor shall be responsible for the complete design of the storm drainage system in accordance with UFC 3-210-10. All current runoff is conveyed via existing ditches or overland. The site will have to be raised and direct the storm drain outfall accordingly. As an aid to the designer, copies of the site and storm drainage improvements are included for information only in Appendix A. These features are provided solely for informational purposes and should not be considered final designs. Should the designer choose to implement an improved design or alternative features, they may proceed upon obtaining review and approval from the COR and PBA.

Stormwater Management

As stated previously, it shall be the responsibility of the Contractor to fulfill any additional requirements for SWM/E&S/NPDES permitting. The Contractor is responsible for designing the most drainage efficient measures that are in accordance with the Arkansas Stormwater Best Management Practices Manual, and with concurrence from PBA. Open storm drainage, including sheet flow, swales, and ditches, should be used in lieu of closed systems (underground piping and structures) where possible in accordance with the environmental site design parameters.

Roof Runoff

Roof runoff shall be directed away from pedestrian walking areas and roadways and shall discharge to a splash block or other hardstand. Roof runoff discharging on roadways shall be connected directly to a storm drain. For gutters and downspouts, prepare calculations to determine the minimum drainage requirements using the calculation method as specified in the Sheet Metal and Air Conditioning Contractors National Association (SMACNA) Architectural Sheet Metal Manual (current edition). Obtain the rainfall component for the project site from UFC 3-400-02, "Design: Engineering Weather Datan.

Storm Drains and Culverts

The Contractor shall use reinforced concrete pipes or box culverts under all paved surfaces. Pipe, bedding, and backfill shall be of adequate strength (or stiffness) to support the earth, live, and construction loads imposed on the pipe. Only pipe materials that have a minimum design service life of 50 years shall be allowed for permanent installation. Corrugated metal pipe shall not be used. As a minimum, all pipe joints shall be soil tight. The Contractor shall specify watertight resilient pipe connectors at drainage structures when the water table is at or above the pipeline. The new storm drainage system shall match the existing storm drain system in kind.

Concrete Pipe

Reinforced concrete pipe shall be a minimum Class III. Concrete pipe shall be assumed to have a minimum design service life of 50 years. Concrete culverts and storm drains shall be protected by a minimum of 3 feet of cover during construction to prevent damage by heavy construction equipment.

Plastic Pipe

Plastic pipe may be used for storm drains within turf areas, subdrains, or roof collectors. Stiffness of the plastic pipe and soil envelope shall be such that the predicted long-term deflection shall not exceed the lesser of manufacturer's requirements or 7.5 percent. Plastic storm drains shall be protected by a minimum of 3 feet of cover during construction to prevent damage by heavy construction equipment. Split couplers shall not be allowed for corrugated high-density polyethylene pipe. Plastic pipe shall be assumed to have a minimum design service life of 50 years.

6.4.7.2 WATER SYSTEMS DESIGN

The Contractor shall be responsible for the design and construction of the water service systems (complete with pressure boosting pumps and flow meters as required). The water system shall be designed, constructed, operated, and maintained in compliance with the UFC 3-230-01, UFC 3-230-02, UFC 3-230-03, and PBA Installation Design Guide. A 6-inch water line needs to be rerouted around the new ACP to connect to the buildings south and southwest. As an aid to the designer, copies of the site and water systems are included for information only in Appendix A. These features are provided solely for informational purposes and should not be considered final designs.

Thrust Restraint

Provide thrust restraint for all piping, valves, fittings, and other appurtenances of the water distribution system.

Fire Service Requirements

Provide fire department connections and post indicator valve in accordance with UL 405 and UL 789. Hydrants shall be provided as required by UFC 3-600-01 to provide protection for all structures and features on the site. Fire hydrants shall be directly connected to the distribution main independently from other services and shall be dry barrel type. A shutoff (key-operated gate) valve shall be provided between the hydrant and the point of connection to the distribution line. Provide tamper switches for the PIVs. Bollards shall be placed around the post indicator valve when adjacent to pavement and able to be removed by a single person. Bollards shall comply with UFC 3-600-01.

Backflow Prevention

Provide backflow prevention and cross connection control (in accordance with AWWA M-14). Freeze protection shall be provided as required in UFC 3-230-01.

6.4.7.3 GAS

New gas connections may be linked to the existing high-pressure 8-inch gas pipeline located along the southern edge of Sibert Road.

6.4.7.4 SANITARY SEWER

The Contractor shall be responsible for the design and construction of the sanitary sewer service. The sanitary system shall be designed, constructed, operated, and maintained in compliance with UFC 3-240-01. An existing lift station (24550), located just south of Building 24560 (MWR Game Check

Station), currently collects wastewater from Buildings 24560, 24770, 24761, and 24610. The lift station pumps approximately 175 feet to Manhole 26180, situated east of B24560, followed by a gravity flow route of roughly 400 feet north via an 8-inch pipe to Manhole 26192, which connects to an existing 10-inch sanitary sewer line running east along the south side of Hoadley Road.

The 10-inch vitrified clay sewer line extends eastward from Manhole 26181 at the Plainview Gate through Manhole 26192 for approximately 637 feet, terminating at Manhole 26183, where the line transitions to an 8-inch vitrified clay pipe and continues northeast, crossing Hoadley and Sibert Roads. Given that these pipes have exceeded their design life and may be experiencing deterioration, the existing 10-inch vitrified clay pipe between Manholes 26181 and 26183 shall be replaced, as well as the 8-inch line from Manhole 26180 to Manhole 26192. The current infrastructure has sufficient capacity to accommodate the projected increase. As an aid to the designer, copies of the site and sanitary sewer systems are included for information only in Appendix A. These features are provided solely for informational purposes and should not be considered final designs.

6.5 ARCHITECTURE

6.5.1 GENERAL

To the maximum extent possible within the contract cost limitation, the buildings shall conform to the look and feel of the architectural style and shall use the same colors as adjacent facilities as expressed herein. The Government will evaluate the extent to which the proposal is compatible with the architectural theme expressed in the RFP during the contract or task order competition. The first priority in order of importance is that the design provides comparable building mass, size, height, and configuration compared to the architectural theme expressed herein. The second priority is that design is providing compatible exterior skin appearance based upon facade, architectural character (period or style), exterior detailing, matching nearby and installation material/color pallets, as described herein.

6.5.2 DESIGN

The Pine Bluff Arsenal Installation Planning Standards is provided in Appendix E for information only, to establish the desired site and architectural themes for the area. Appendix E identifies the desired project look and feel based on PBA's IPS as Garrison Visual Zone, i.e., building exterior skin, roof lines, delineation of entrances, proportions of fenestration in relation to elevations, shade and shadow effects, materials, textures, exterior color schemes, and organizational layout.

The design shall address Pine Bluff Arsenal's identified preferences. Implement these preferences considering the following:

A. Meets Milestones within Maximum Performance Duration.
B. Achieves Full Scope identified in this Solicitation
C. Best Life-Cycle Cost Design
D. Meets the Specified Sustainable Design requirements
E. Complies with Energy Conservation Requirements Specified in this RFP.

6.5.2.1 PRIORITY #1. VISUAL COMPATIBILITY

Facility Massing (Size, Height, Spacing, Architectural Theme, etc.) Exterior Aesthetic Considerations: The buildings massing, exterior functional aesthetics, and character shall create a comprehensive and harmonious blend of design features that are sympathetic to the style and context of the

Installation. See Appendix E - Pine Bluff Arsenal Installation Planning Standards for the Installation's intent for this area.

6.5.2.2 PRIORITY #2. ARCHITECTURAL COMPATIBILITY

Exterior Design Elements (Materials, Style, Construction Details, etc.) Roofs, Exterior Skin, and Windows & Door Fenestrations shall promote a visually appealing compatibility with the desired character while not sacrificing the integrity and technical competency of building systems.

See Appendix E for exterior colors that apply to Architectural character at Pine Bluff Arsenal. The manufacturers and materials referenced are intended to establish color only and are not intended to limit manufacturers and material selections.

6.5.2.3 ADDITIONAL ARCHITECTURAL REQUIREMENTS

Install fall protection anchor points on all roofs with a slope greater than 2:12.

6.6 INTERIOR DESIGN

6.6.1 GENERAL

Refer to sections 3.5.1 and 5.4.6 and 5.4.7 for technical and other requirements. 6.6.2 provides project-specific finish solutions.

6.6.2 DESIGN

Flooring: Lobby flooring to be a mid-tone through-body porcelain tile. Provide Resilient Tile in office areas. Vestibule is to include a low profile surface mounted entrance grid flooring. Provide Mid-tone porcelain tile in the break room and in toilet rooms. Static-control concrete sealer shall be used in Communications rooms. Provide Rubber Floor Tile flooring in storage and janitorial rooms. Resilient floor finish height transition strips shall be provided as required. Sealed concrete flooring is to be provided in Electrical and Mechanical spaces.

Wall Base: 4" high cove-toe rubber wall base throughout at Resilient tile, and static dissipative flooring. Provide tile base at all locations with tile flooring, including the Lobby.

Walls: Provide latex painted gypsum walls throughout. Toilet rooms are to have full-height tile on all walls. Wainscot-height decorative wall protection will be provided in the lobby, all circulation hallways or corridors and in the break room.

Ceilings: Acoustic lay-in ceiling throughout. Provide painted gypsum board soffits as part of the design for aesthetics in public areas. Toilet rooms shall have epoxy painted gypsum board ceilings.

Casework: High pressure laminate on all vertical surfaces. Light to Medium color Solid Surface Acrylic counter tops.

Specialty: 48"H resilient corner guards shall be provided on exposed gypsum board corners throughout the project. Corner guard color shall match the wainscot wall protection. Chair rail will be provided in the seating area of the Lobby and the entire Guard Station work area.

Window sills:1/2" thick Solid Surface Acrylic on plywood substrate.

Window Treatments: Aluminum horizontal blinds to be provided at all exterior windows.

INTERIOR FINISH BY ROOM TYPE

ROOM NAME	FLOOR FINISH						BASE FINISH		WALL FINISH							CEILING FINISH			OTHER FINISH	
	EG	CFS	RFT	RT	CFS-SC	T	RB	T	CG	CHR	FRP	PT	PTE	SWP	T	ACT	EXP	PTE	PL	SSF
Break Room						■		■	■			■		■		■			■	■
Hallway				■			■		■			■		■		■				
Comm Room					■		■					■					■			
Command and Control			■				■			■		■		■		■			■	■
Conference/Training Room				■			■					■				■				
Mech/Elec Room		■					■					■					■			
Janitor Closet			■				■				■		■					■		
File Room			■				■					■				■				
Lobby						■		■	■	■		■		■	■	■				■
Offices				■			■					■				■				
Open Office				■			■					■				■				
Storage			■				■					■				■				
Storage - Outside Access			■				■					■					■			
Toilet Rooms						■		■					■		■			■		
Traf. Check In				■			■		■			■				■			■	■
VCC Office				■			■		■			■				■			■	■
Vestibules	■						■						■					■		

FINISH LEGEND

ACT	ACOUSTIC CEILING TILE
CFS	CONCRETE FLOOR WITH SEALER
CFS-SC	CONCRETE FLOOR WITH STATIC CONTROL SEALER
CG	CORNER GUARD
CHR	CHAIR RAIL
EG	ENTRANCE GRID, HEAVY DUTY SURFACE-MOUNTED, LOW PROFILE
EXP	EXPOSED TO STRUCTURE
FRP	FIBERGLASS REINFORCED PANEL - 48"H WAINSCOT
PL	HIGH PRESSURE PLASTIC LAMINATE
PT	PAINT, LATEX
PTE	PAINT, EPOXY
RB	RUBBER WALL BASE, 4"H COVE TOE
RFT	RUBBER FLOOR TILES
RT	RESILIENT TILE (PVC-FREE LUXURY VINYL PLANK, LVT)
SSF	SOLID SURFACE FABRICATION
SWP	SHEET WALL PROTECTION , WAINSCOT HEIGHT
T	PORCELAIN TILE

6.7 STRUCTURAL DESIGN

The four structures: VCC, Gatehouse, ID Check Canopy, and Truck Search Canopy - must be designed according to architectural layouts while allowing for future flexibility and reconfiguration of interior spaces. Structural designs must rely on accurate, site-specific geotechnical data as well as expected loads based on building type and location, following ASCE 7 loading criteria. Materials are to be chosen to ensure the design can support these loads efficiently and cost-effectively.

6.7.1 GENERAL

The VCC needs to use materials and systems that allow flexible space allocation and design consideration for UFC requirements. A tornado shelter needs to be considered in the design to meet new ASCE and UFC requirements. The Gatehouse must be designed for ballistic requirements in addition to occupation and lateral loads. The two canopies mainly provide shelter for vehicles to meet operational needs.

6.7.2 DESIGN

The VCC and Gatehouse buildings must account for both occupancy loads as well as environmental forces, including wind and seismic activity. The two canopies are primarily engineered to support roof loads. Design standards are based on UFC documentation.

6.8 PLUMBING

6.8.1 VISITOR CONTROL CENTER - ELECTRIC WATER HEATERS

Electric storage type domestic water heater, expansion tank, and hot water recirculation pump must be provided to serve all hot water using plumbing fixtures. Water heater must deliver and store at 140°F. Point of use ASSE 1070 mixing valves must be provided at each fixture. A shutoff valve must be

provided at the water heater's cold and hot water piping connection. Water heater must be located in accessible location above mop sink.

6.8.2 VISITOR CONTROL CENTER - FIXTURES

Plumbing fixtures must be EPA WaterSense labeled as required by UFC 1-200-02. Sinks must be 1.5 gpm. Lavatories must be 0.35 gpm. Low Flow Tank Type Water closets must be 1.28 gpf. All trims will be manual control.

Freeze less concealed box-type wall hydrants will be provided on the building exterior for general maintenance.

Bi-level electric water cooler will be installed within the visitor control center lobby.

The breakroom sink will be equipped with a garbage disposal and point of use reverse osmosis system installed under counter with a deck mounted faucet.

6.8.3 GATEHOUSE - ELECTRIC WATER HEATERS

Electric storage-type domestic water heater, expansion tank, and hot water recirculation pump must be provided to serve all hot water using plumbing fixtures. Water heater must deliver and store at 140˚F. Point of use ASSE 1070 mixing valves must be provided at the latrine lavatory. A shutoff valve must be provided at the water heater's cold and hot water piping connection. Water heater must be located in accessible location above mop sink.

6.8.4 GATEHOUSE - FIXTURES

Plumbing fixtures must be EPA WaterSense labeled as required by UFC 1-200-02. Lavatories must be 0.35 gpm. Low Flow Tank Type Water closets must be 1.28 gpf. All trim must be manual. Hose bibbs must be provided under lavatory in each restroom for maintenance purposes.

Freeze less concealed box-type wall hydrants must be provided on the building exterior for general maintenance.

6.8.5 PIPING

Above ground domestic water piping must be Type Lor K hard drawn seamless copper tube with lead-free soldered joints and fittings. Domestic water piping must be provided with fiberglass pipe insulation with an all-service jacket. Cold water pipe insulation must be provided with a vapor barrier jacket to prevent condensation. All indoor piping exposed within 8 feet of finished floor must be provided with aluminum jacketing.

Underground domestic water piping must be Type K hard drawn seamless copper tube with brazed joints.

Drain, waste, and vent (DWV) piping must be standard weigh cast iron DWV pattern fittings. DWV piping must be in accordance with ASTM A74 and CISPI 301 marked. Underground piping must utilize hub and spigot type connections whereas above-ground piping must utilize non-hub type connections.

Condensate drainage piping must be copper. Copper piping must be type DWV hard temper seamless drainage tube with lead-free soldered joints and fittings. All condensate piping must be provided with elastomeric foam insulation.

6.9 HEATING, VENTILATING, AND AIR CONDITIONING

6.9.1 VISITOR CONTROL CENTER - AIR HANDLING UNIT, VAV TERMINAL UNITS

A single split DX VAV vertical air handling unit with remote condensing unit must be installed in the mechanical room and will serve single duct VAV terminal units throughout the visitor control center. The air handler must consist of an intake section, MERV 8 pre-filter and MERV 13 final filter, DX cooling coil, and supply fans. Remote condenser section must be equipped with variable scroll compressors to modulate capacity. Condensate from the unit must be routed to the mechanical room floor drain.

Terminal units must utilize primary air control dampers to modulate airflow with silicon controlled rectifier (SCR) controlled electric heat to maintain space conditions.

Ventilation air must be brought in through a louver or hood mounted a minimum of 10 ft above finished grade and ducted to the return main for the AHU. Modulating control dampers must be installed in the outside and return ductwork to control ventilation airflow during operation. The outside air damper must be interlocked to close when the HVAC emergency shutoff located in the VCC office is activated.

The indoor and outdoor units must be located on concrete pads.

6.9.2 VISITOR CONTROL CENTER - EXHAUST FAN

A single inline exhaust fan must be provided for general exhaust of the restroom and janitor closet. Exhaust ductwork must include an isolation damper to seal the opening when the HVAC emergency shutoff is activated.

6.9.3 VISITOR CONTROL CENTER - SUPPLY FAN

A single inline supply fan must be provided to supply ventilation airflow, as required by ICC 500, for the internal storm shelter. Supply ductwork must include an isolation damper to seal the opening unless the supply fan is activated.

6.9.4 VISITOR CONTROL CENTER - SPLIT SYSTEM

Split systems must be provided to serve the COMM and Mechanical room for the building. Each split system must consist of an indoor wall mounted unit with washable filters, wall mounted programmable thermostat, remote temperature sensor, and exterior heat pump/condensing unit. Refrigerant piping between the indoor and outdoor units must be provided. Condensate must be routed to the mechanical room floor drain. The indoor unit location must be coordinated with the equipment in the room. The indoor and outdoor units must be located so they can be easily accessed for maintenance and adequate airflow for operation. The outdoor unit must be located on concrete pads.

6.9.5 VISITOR CONTROL CENTER - ELECTRIC WALL HEATER

Electric wall heaters must be installed in each vestibule to maintain the minimum space conditions. Wall heaters must operate through standalone integral thermostats.

6.9.6 VISITOR CONTROL CENTER - ELECTRIC UNIT HEATER

Electric unit heaters must be installed in the fire room to maintain the minimum space conditions. Unit heaters must operate through standalone integral thermostats.

6.9.7 GATEHOUSE - AIR HANDLING UNIT

A single split DX CAV vertical air handling unit with remote condensing unit must be installed in the mechanical room and will directly serve the rooms in the gatehouse. The air handler must consist of an intake section, MERV 8 pre-filter and MERV 13 final filter, DX cooling coil, hot gas reheat coil, and supply fan. Remote condenser section must be equipped with variable scroll compressors to modulate capacity. Condensate from the unit must be routed to the mechanical room floor drain.

The AHU must modulate cooling and heating capacity to maintain space conditions.

Ventilation air must be brought in through a louver or hood mounted a minimum of 10 ft above finished grade and ducted to the return main for the AHU. Modulating control dampers must be installed in the outside and return ductwork to control ventilation airflow during operation.

The indoor and outdoor units must be located on concrete pads.

6.9.8 GATEHOUSE - EXHAUST FANS

A single inline exhaust fan must be provided for general exhaust of the latrine and janitor closet.

6.9.9 GATEHOUSE - SPLIT SYSTEM

Split systems must be provided to serve the COMM room for the building. The split system must consist of an indoor wall mounted unit with washable filters, wall mounted programmable thermostat, remote temperature sensor, and exterior condensing unit. Refrigerant piping between the indoor and outdoor unit must be provided. Condensate must be routed to the mechanical room floor drain. The indoor unit location must be coordinated with the equipment in the room. The indoor and outdoor units must be located so they can be easily accessed for maintenance and adequate airflow for operation. The outdoor unit must be located on concrete pads.

6.9.10 GATEHOUSE - ELECTRIC UNIT HEATER

Electric unit heaters will be installed in the fire riser and outside storage rooms to maintain the minimum space conditions. Unit heaters will operate through standalone integral thermostats.

6.9.11 GATEHOUSE - UPS REQUIREMENTS

UPS ventilation, sensor, and alarm requirements must be evaluated and systems provided to meet the requirements. Associated controls and alarms must be tied into the base wide UMCS.

6.9.12 PIPING

Refrigerant piping must be Type ACR hard drawn seamless copper tube meeting ASTM B280. The joints must be brazed. The fittings must be wrought copper solder joints meeting ANSI B16.22. All tubing must be cleaned, dehydrated, pressurized with dry nitrogen, plugged, and tagged by the manufacturer "for refrigeration service". All refrigeration piping must be provided with elastomeric foam insulation. All outdoor piping insulation or interior pipe insulation located within 6 ft. of the finished floor must be provided with aluminum jacketing.

Gas piping must be schedule 40 black steel meeting ASTM A53/A53M with threaded or butt-welded joints and fittings. All external piping must be

painted to protect against corrosion. Color of piping shall conform with ASME A13.1.

6.9.13 DUCTWORK

Ductwork must conform to SMACNA recommendations and will have the following static pressure classifications:

Medium pressure Supply ductwork: +4 IN. WC.

Low pressure Supply ductwork: +2 IN. WC.

Outside, Exhaust, and Return ductwork: -2 IN. WC. Ductwork must be galvanized steel.

Seal Class A - Longitudinal seams and transverse joints in nonwelded ductwork must be sealed.

Supply, return, and outside air ductwork must be insulated for energy conservation and to prevent condensation. All ductwork insulation located within 6 ft. of the finished floor must be provided with aluminum jacketing.

6.10 FIRE PROTECTION

6.10.1 GENERAL

The Design Build Contractor will design and install an automatic fire suppression system as the one-story buildings (VCC and Gatehouse) are not afforded the minimum required fire flow required by UFC 3-600-01. This is a mandate by the USACE.

The Design Build Contractor will provide portable fire extinguishers where required by NFPA 101, Life Safety Code. Portable fire extinguishers are required to be located and installed in accordance with NFPA 10 (UFC 3-600-01 § 9-17.2.1).

The Design Build Contractor will provide a minimum of two (2) fire hydrants based on the required fire flow of 1,500 gpm (2 hours) (UFC 3-600-01 and NFPA 1). All exterior walls must be within 350 feet of a fire hydrant (UFC 3-600-01 § 9-3.5.8.2).

On site fire hydrant flow testing (June 2024 - see attached fire flow test report - Appendix L) indicated a fire water flow of 1,157 gpm@ 20 psi. The minimum required fire flow (NFPA 1 - Table 18.4.5.2.1) is 1,500.

On site fire hydrant flow testing (June 2024 - see attached fire flow test report - Appendix L) indicated a fire water flow of 1,157 gpm@ 20 psi. The minimum required fire flow (NFPA 1 - Table 18.4.5.2.1) is 1,500 gpm@ 20 psi for duration of 2 hours. UFC 3-600-01 Section 9-2.1 and NFPA 1142 have allowances to reduce the required fire flow to 1,000 gpm when the building is protected with an automatic sprinkler system.

6.10.2 DESIGN

The Design Build Contractor shall provide the services of a QFPE as required by UFC 3-600-01 The QFPE shall be involved in every aspect of the design, construction, and commissioning in this project as it relates to fire protection engineering and life safety. The QFPE shall be directly hired by the DB Contractor as an integral part of the DB Contractor's design team for identifying and incorporating all of the fire protection and life-safety requirements for this project.

In accordance with UFC 3-600-01, Fire Protection Engineering for Facilities, the fire protection engineer of record shall be a registered Professional Engineer in the State of Arkansas who has passed the fire protection engineering written examination administered by the National Council of Examiners for Engineering and Surveys (NCEES), or a registered Professional Engineer in the State of Arkansas in a related engineering discipline with a minimum of 5 years of experience, dedicated to fire protection engineering that can be verified with documentation.

The QFPE shall be in responsible charge of the life-safety plans and accompanying building code analysis

Construction (shop) drawings and calculations for fire extinguishing systems must be prepared in accordance with UFC 3-600-01.

Construction (shop) drawings and calculations for fire alarm and Mass Notification systems must be prepared in accordance with UFC 3-600-01.

The Design Build Contractor shall develop and provide an addressable fire alarm and Mass Notification System compatible with the existing base wide fire alarm system.

Interior spaces served by fire alarm and voice evacuation systems, shall comply with UFC and UFGS-for speech intelligibility. A UL-listed firestopping system shall be used for conduits or cables that pass through vertical separations. Panels (including but not limited to fire alarm control panel [FACP], annunciator [ANN], and notification appliance circuit [NAC]) shall not be installed above 6 feet on walls, and a 3-foot clearance shall be maintained around components.

Pathway Survivability Level 1 shall be provided for pathways. Pathways for initiating device circuits (IDCs), signaling line circuits (SLCs), and NACs shall comply with a Class B pathway class designation and provide requisite circuit supervision. All pathways for communications between building fire alarm control units shall be Class X pathway class. Fire alarm wiring must be installed in metal raceway separate from all other systems. Manual pull stations shall be located by each exit.

Notification appliances shall consist of clear strobe visual notification appliances marked with the word "ALERT" for indication of fire alarm signals. Use of "ALERT" markings is not allowed on the fire alarm devices, and is reserved for other life-safety systems (such as MNS), where installed. Audible notification appliances shall use speakers for both fire alarm and voice messaging purposes.

Spare parts shall include 2 percent or a minimum of two of each type of devices used in the system (examples include but not limited to: bases, modules, detectors, pull stations, speaker-strobes, magnetic door holders, or similar such components). For software-based systems, a record copy of the site-specific software shall be delivered to fire alarm technicians at the installation after all changes have been made for acceptance testing.

The fire alarm system shall be fully tested to ensure that equipment and components function as intended. Tests shall be witnessed and approved by the QFPE and shall include testing in accordance with ANSI/ASA S3.5, "American National Standard Methods for Calculation of the Speech Intelligibility Index," to provide a Common Intelligibility Scale value for all common spaces. Upon completion of specified tests, the DB contractor shall complete and submit the Contractor's Certificate of Completion. The extent of the

renovations may require a recertification of the entire buildings fire alarm / MNS systems to be witness by Base Fire Department.

The Design Build Contractor shall develop and provide a complete automatic sprinkler protection system in accordance with UFC 3-600-01, NFPA 13, and other applicable codes and standards.

The Design Build Contractor shall conduct a fire flow test, witnessed by the QFPE, and prepare preliminary hydraulic calculations to determine the most efficient supply pipe routing and if a fire pump (psi) or additional fire protection water (flow) is required.

The Design Build Contractor, via the above noted flow test hydraulic analysis, will determine if a fire pump and or above ground supplemental water storage is required and include in the design.

6.11 SITE ELECTRICAL AND COMMUNICATION SYSTEM

All exterior site power distribution and installations shall comply with UFC 3-550-01. The primary/secondary service feeders, concrete pad/service transformer, stationary natural gas generator/docking station or portable generator connection cabinet and associated automatic transfer switch shall be provided on site by Design Build Contractor. The power distribution on site shall be underground utility service lateral and route from overhead to underground. Site lighting shall comply with UFC 3-530-01 and UFC 4-022-01.

6.11.1 TELECOMMUNICATIONS AND SECURITY

The new telecommunication service to ACP facilities will be served from an existing fiber optic cable pull box. New conduit along with new fiber optic cabling shall be extended from existing pull box to Gatehouse. The existing pull box is approximately located along Siebert Street.

The new ACP facilities (Visitor Control Center (VCC), Gatehouse, guard booths, and Overwatch booth) shall have new fiber optic cabling installed from new Gatehouse. New fiber optic cabling within new conduit shall be extended from Visitor Center to support ACP facilities.

6.11.2 ELECTRICAL

The new service to ACP facilities will be served from the pad-mounted service transformer, 208Y/120V, 3-Phase, 4-Wire system. Currently, the service for new ACP facilities and site are overhead service lateral. PBA owns three electrical substations; therefore, there is not privatized power from commercial utility power providers. The electrical power service will be coordinated with Base Electrical for new electrical power service. The new service will be routed from overhead to underground, and to pad-mounted transformer. The stand-by natural gas generator will be located within 30-feet of the transformer for ease of service per UFC 4-022-01, paragraph 5-8.2 for ACP site back-up power. An additional docking station or portable generator connection cabinet must be provided for portable generator connection.

A stationary standby natural gas Generator/ATS-power provisions must be provided and must match the new voltage system (208Y/120V, 3-phase, 60-Hz) The Generator will provide back-up power for entire ACP facilities and site, including Vehicle Active Barrier system and controls.

The ACP facilities and site lighting/power will be served from an Automatic Transfer Switch 'ATS', rated 800A, 208Y/120V, 3-Phase, 4-Wire, outdoor rated, externally mounted surge protection device. The panelboard 'MOP' will be fed

from building pad-mounted transformer and back-up entirely by a natural gas generator via ATS. The panel 'MOP' must be located within the pad-mounted transformer and generator vicinity. Provide dedicated underground feeders from panelboard 'MOP" to the Gatehouse's distribution panelboard, Truck Search guard booth/ID Check guard booths, site lighting panelboard.

All conduits will be routed underground electrical raceway system. A minimum PVC schedule 40 will be provided and routed via concrete encased under vehicular traffic area or within eight (8) feet of the roadway IAW 4-022-01, 5.8.8. If not feasible, a minimum PVC schedule 80 will be provided and routed via non-vehicular traffic area with direct buried construction.

Site LED lighting will be provided around the perimeter fence and also the parking/site area for security. Site lighting will be pole mounted, round and aluminum as required per UFC 3-530-01.

6.12 FACILITY ELECTRICAL AND TELECOMMUNICATION SYSTEMS

New Visitor Control Center (VCC) shall have new telecommunication cabling installed. New telecommunication cabling shall support workstations, phone lines, printers, and VSS cameras (GFGI). New visitor center shall have new access control cabling installed to support access control and monitor doors. New intrusion detection cabling shall be installed to support duress buttons, glass break devices, and door contacts as needed. All cabling shall meet government telecommunications standards.

New Gatehouse shall have new telecommunication cabling installed. New telecommunication cabling shall support workstations, phone lines, printers, and VSS cameras (GFGI). New Gatehouse shall have new access control cabling installed to support access control and monitor doors. New intrusion detection cabling shall be installed to support duress buttons, glass break devices, and door contacts as needed. All cabling shall meet government telecommunications standards.

New Overwatch booth shall have new telecommunication cabling installed. New telecommunication cabling shall support workstations, phone lines, printers, and VSS cameras (GFGI). New over watch booth shall have new access control cabling installed to support access control and monitor doors. New intrusion detection cabling shall be installed to support duress buttons, glass break devices, and door contacts as needed. All cabling shall meet government telecommunications standards.

New guard booths shall have new telecommunication cabling installed. New telecommunication cabling shall support workstations, phone lines, printers, and VSS cameras (GFGI). New guard booths shall have new access control cabling installed to support access control and monitor doors. New intrusion detection cabling shall be installed to support duress buttons, glass break devices, and door contacts as needed. All cabling shall meet government telecommunications standards.

New Truck Search Canopy guard booth shall have new telecommunication cabling installed. New telecommunication cabling shall support workstations, phone lines, printers, and VSS cameras (GFGI). New Truck Search Canopy guard booth shall have new access control cabling installed to support access control and monitor doors. New intrusion detection cabling shall be installed to support duress buttons, glass break devices, and door contacts as needed. All cabling shall meet government telecommunications standards.

6.13 SUSTAINABLE DESIGN

Sustainable strategies and features must be integrated into the design to minimize energy consumption, conserve resources, minimize adverse effects on the environment, and improve occupant productivity, health, and comfort. These strategies and features are outlined within this document as well as the associated attachments (plans, specifications, etc.).

6.14 SECURITY (ANTITERRORISM STANDARDS)

PBA ATO performed a security engineering risk analysis in accordance with UFC 4-020-01 to meet requirements in UFC 4-010-01 §3-2.1 as the VCC is outside the controlled perimeter, and determined the following standards from UFC 4-010-01 Chapter 3 must be met for the VCC (and those not listed are not required to be met):

Standard 2 - Unobstructed Space: must be compliant.

Standard 9 - Exterior Masonry Walls: exterior walls must meet this requirement.

Standard 10 - Glazing: must be compliant.

Standard 12 - Exterior Doors: exterior doors must be compliant.

Standard 14 - Roof Access: new roof access must be compliant.

Standard 15 - Overhead Mounted Architectural Features: must be compliant.

Standard 16 - Air Intakes: must be compliant.

Standard 18 - Emergency Air Distribution Shutoff: must be provided.

Standard 19 - Equipment Bracing: must be provided.

Standard 21 - Mass Notification: must be provided.

Furthermore, PBA ATO confirmed that no hardening in addition to those standards listed above is required for the VCC based on the location of parking and roadways. The USACE-Protective Design Mandatory Center of Expertise (PD-MCX) reviewed this analysis and confirmed that the location of parking and roadways in the site plan located at Appendix A meets the UFC, Army Standard, and Army Standard Design requirements.

6.15 FRCS CYBERSECURITY

6.15.1 GENERAL

This section assumes a certain level of understanding of the Risk Management Framework (RMF) and, more specifically, the Unified Facilities Criteria (UFC) for Cybersecurity of Facility-Related Control Systems (FRCS), UFC 4-010-06. The design, relative to the FRCS incorporated herein, is tailored to the requirements of the UFC. This criterion supports the RMF, which outlines the DoD's process for securing information systems (IS) and modern-day industrial control systems (ICS) and devices.

Although the UFC's application will not result in issuance of an authorization-to-operate (ATO), implementation of the resulting secure configuration baseline onto FRCS which operate at Platform Information Technology (PIT) Levels 1 or higher will produce a system that is appropriately adapted for a favorable authorization decision. FRCS for the project which communicates at PIT Level O will be identified as well. However, security will take the form of physical access control because,

while they will not communicate over the network, devices may cause physical damage. A valve that is left in the "Open" position is an example of this. Where these devices and/or conditions are identified, such will be documented within the Control Systems Description Section below.

Control systems are categorized based on the impact of confidentiality, integrity, and availability (CIA) loss to the organization's mission, which are classified as High, Moderate, and Low. These levels are determined jointly by the system owner (SO) and authorizing official (AO) for the respective control systems.

This design addresses cybersecurity for FRCS relevant to construction of a new Access Control Point (ACP) and Commercial Vehicle Inspection Point at the Plainview Entrance, Pine Bluff Arsenal, Pine Bluff, AR. The new facility will deliver space to incorporate Heating Ventilation and Air Conditioning (HVAC), Electrical Systems (ES), Fire and Life Safety Systems (FLS), Integrated Electronic Security Systems (I-ESS), and Physical Access Control Systems (PACS). The design is tailored to the engineering solutions with substantive contribution from the relevant engineering disciplines.

6.15.2 PRIMARY DESIGN CRITERIA

The cybersecurity design for applicable FRCS shall be produced in accordance with the following codes and standards:

Department of Defense Instructions (DODI)

- DoDI 8500.01, Cybersecurity, Change 1, October 2019
- DoDI 8510.01, Risk Management Framework for DoD Systems, July 2022
- DoDI 8530.01, Cybersecurity Activities Support to DoD Information Network Operations, Change 1, July 2017
- DoDI 8531.01, DoD Vulnerability Management, September 2020
- DoDI 8551.01, DoD Instruction 8551.01 Ports, Protocols, and Services Management, May 2023

Department of Defense Manuals (DOOM)

- DoDM 8140.03, Cyberspace Workforce Qualification and Management Program, February 2023

Directive-Type Memorandums (DTM)

- DTM 08-060 Policy on Use of Department of Defense (DoD) Information Systems - Standard Consent Banner and User Agreement, Change 5, September 2013

Institute of Electrical and Electronics Engineers (IEEE)

- IEEE 802.lx, Standard for Local and Metropolitan Area Networks - Port based Network Access Control, February 2020

Internet Engineering Task Force (IETF)

- IETF RFC 2819, Remote Network Monitoring Management Information Base, May 2000

National Institute of Standards and Technologies

- Federal Information Processing Standards Publication (FIPS-PUB) 140-3, Security Requirements for Cryptographic Modules, March 2019
- FIPS-PUB 200 Minimum Security Requirements for Federal and Information Systems, March 2006

- Federal Information Processing Standards Publication (FIPS-PUB) 201-3, Personal Identity Verification (PIV) of Federal Employees and Contractors, January 2022

Unified Facilities Criteria (UFC)

- UFC 4-010-06 Cybersecurity for Facility Related Control Systems, October 2023

6.15.3 ORGANIZATIONAL DESIGN CRITERIA

U.S. Department of the ARMY (DA)

- Army Regulation (AR) 25-2, Army Cybersecurity, April 2019
- Army Regulation (AR) 380-49, Army Industrial Security Program, March 2013
- Army Regulation (AR) 380-67, Army Personnel Security Program
- USACE ECB 2022-2 Cybersecurity Requirements for Design and Construction of Control Systems and Integrated Low Voltage Systems for Permanent and Non-Permanent Construction, January 2022

6.15.4 FACILITY RELATED CONTROL SYSTEMS

6.15.4.1 EXISTING FACILITY RELATED CONTROL SYSTEMS

- Base-wide Utility Monitoring and Control System (UMCS)
- Base-wide Fire Alarm Reporting System (FARS)

6.15.4.2 PLANNED FACILITY RELATED CONTROL SYSTEMS

- Building Automation Systems (BAS)
- Electrical Systems (ES)
- Fire and life Safety Systems (FLS)
- Integrated-Electronic Security Systems (Rough-In Only)

6.15.5 FACILITY CLASSIFICATION

Based on the mission of the organization and confirmation received from System Owner, a Facility Classification rating of Mission Support has been determined for planned facilities.

6.15.6 CONFIDENTIALITY INTEGRITY AND AVAILABILITY (C-I-A) IMPACT LEVELS

The C-I-A System Loss Impact Ratings for the FRCS identified below were obtained using the provided Facility Classification as input for the Facility-Related Control Systems Master List, available on the Office of the Assistant Secretary of Defense for Sustainment's FRCS Cybersecurity website. All levels were confirmed by the system owner and authorizing officials.

- Building Automation Systems (BAS): LOW-LOW-LOW
- Electrical Systems (ES): LOW-LOW-LOW
- Fire and life Safety Systems (FLS): LOW-MODERATE-MODERATE

6.15.7 CONTROL CORRELATION IDENTIFIERS (CCIS)

The requirements for final CCI tailoring shall be implemented in accordance with UFC 4-010-06 Section 3-1.3. This part of the cybersecurity design process shall be coordinated with the other discipline leads.

Starting Security Control Set and Tailoring Recommendation

The starting Security Control Set is provided, per control system, in the appendices. These controls were determined using the C-I-A Impact Ratings

listed above. Upon request, the control set and CCI lists may be provided in Microsoft Excel format for the reviewer's convenience.

-- End of Section --

SECTION 01 14 00

WORK RESTRICTIONS
11/22, CHG 5: 05/25

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2024) Safety -- Safety and Occupational Health (SOH) Requirements

1.2 SUBMITTALS

Government approval is required for submittals with a "G" or [11]8[11] classification. Submittals not having a "G" or [11]8[11] classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

List of Contact Personnel

SD-07 Certificates

3Rs Explosive Safety Education Training Certificate (annual submission required)

1.3 SPECIAL SCHEDULING REQUIREMENTS

a. Have materials, equipment, and personnel required to perform the work at the site prior to the commencement of the work. Specific items of work to which this requirement applies include:

b. The Pine Bluff Arsenal will remain in operation during the entire construction period. Conduct operations so as to cause the least possible interference with normal operations of the activity.

c. Permission to interrupt any Activity roads, railroads, or utility service must be requested in writing a minimum of 15 calendar days prior to the desired date of interruption.

1.4 CONTRACTOR ACCESS AND USE OF PREMISES

1.4.1 Activity Regulations

Ensure that Contractor personnel employed on the Activity become familiar

with and obey Activity regulations including safety, fire, traffic and security regulations. Keep within the limits of the work and avenues of ingress and egress. Wear appropriate personal protective equipment (PPE) in designated areas. Do not enter any restricted areas unless required to do so and until cleared for such entry. Ensure all Contractor equipment, including delivery vehicles, are clearly identified with their company name. The contractor is required to coordinate with the PBA and Little Rock District regarding the use of separate construction access routes and the designated construction bubble. While these arrangements are permitted, the contractor must verify the details with the PBA to ensure compliance and confirm that all access and boundaries are acceptable.

1.4.1.1 Subcontractors and Personnel Contacts

Provide a list of contact personnel of the Contractor and subcontractors including addresses and telephone numbers for use in the event of an emergency. As changes occur and additional information becomes available, correct and change the information contained in previous lists.

1.4.1.2 No Smoking Policy

Smoking is prohibited within and outside of all buildings on installation, except in designated smoking areas. This applies to existing buildings, buildings under construction and buildings under renovation. Discarding tobacco materials other than into designated tobacco receptacles is considered littering and is subject to fines. The Contracting Officer will identify designated smoking areas.

1.4.2 Working Hours

Arrange work schedule so that the work performed at the Government installation will be during the normal day shift established as 7:00 a.m. to 4:30 p.m., Monday through Friday, except Federal holidays, with the option of working weekends with the approval of the Contracting Officer's Representative. Work at the installation during other periods of time will be permitted only on the specific approval of the Contracting Officer or his authorized representative for each specified time. In the event an operation is necessary which cannot be completed within the day shift period specified above without loss or additional cost to the Contractor, the work day period for that operation may be extended upon request of the Contractor and approval of the Contracting Officer.

1.4.3 Inspection Hours

The contract requires that certain tests be performed in the presence of the Contracting Officer or his representative. These tests will be scheduled between 08:30 a.m. and 03:00 p.m., Monday through Thursday, excluding Federal holidays; the Government shall be given 72 hours advance notice.

1.4.4 Work Outside Regular Hours

Work outside regular working hours requires Contracting Officer approval. Make application 15 calendar days prior to such work to allow arrangements to be made by the Government for inspecting the work in progress, giving the specific dates, hours, location, type of work to be performed, contract number and project title. Based on the justification provided, the Contracting Officer may approve work outside regular hours. During periods

of darkness, the different parts of the work must be lighted in accordance with requirements of EM 385-1-1.

1.4.5 Installation Access

1.4.5.1 AT Level 1 Awareness Training (AT)

Contractor Employees requiring access to Army Installations, facilities, and controlled access areas shall complete Level 1 AT within 5 calendar days after contract start date and within 5 calendar days of new employees commencing performance. Contractor will be provided Pine Bluff Arsenal Force Protection training which includes Antiterrorism training to review with employees.

1.4.5.2 IWATCH Training

The Contractor with an area of performance within an Army-controlled installation, facilities or area shall brief all employees on the local iWATCH program. This local developed training will be used to inform employees of the types of behavior to watch for and instruct employees to report suspicious activity to the Contracting Officer's Representative or the KO. This training shall be completed within 30 calendar days of Contract Award and within 30 calendar days of new employees commencing performance. The Contractor shall report completion for each affected Contractor Employee and subcontractor employee, to the Contracting Officer's Representative, or to the KO if a Contracting Officer's Representative is not assigned, within 15 calendar days after completion of training. Contractor will be provided Pine Bluff Arsenal Force Protection training which includes IWATCH training to review with employees.

1.4.5.3 OPSEC Training

In accordance with AR 530-1, Operations Security, new contractor employees shall complete Level I OPSEC training within 30 calendar days of their reporting for duty and annually thereafter. Contractor will be provided Pine Bluff Arsenal OPSEC training to review with employees.

1.4.5.4 Physical Security

The Contractor shall safeguard all Government property provided for Contractor use. At the close of each work period, Government facilities, equipment and materials shall be secured.

1.4.5.5 Identification of Contractor Employees

All Contractor personnel attending meetings, answering Government telephones and working in other situations where their contractor status is not obvious to third parties are required to identify themselves as such to avoid creating an impression that they are Government employees. The Contractor shall ensure that all documents or reports produced by Contractor personnel are suitably marked as contractor products or that contractor participation is appropriately disclosed. The Contractor's status as a "Contractor'' shall be predominantly displayed in all correspondence types (to include signature blocks on e-mail) and dealings with Government or non-Government entities/Contractor personnel shall wear identification badges distinguishing themselves as such. The badges shall have the company name, employee name and the word "Contractor" displayed. The Contractor shall retrieve all identification media (including vehicle passes) from their employees who depart employment for any reason. All

identification media (i.e., badges and vehicles passes) shall be returned to the KO within 14 days of an employee's departure.

Contractor and all associated sub-contractors employees shall provide all information required for background checks to meet installation access requirements to be accomplished by Pine Bluff Arsenal Police Force. Contractor workforce must comply with all personal identity verification requirements (FAR clause 52.204-9, Personal Identity Verification of Contractor Personnel) as directed by DOD, HQDA and/or local policy. Contractor and all associated sub-contractors employees shall comply with adjudication standards and procedures using the National Crime Information Center Interstate Identification Index (NCIC-III) and Terrorist Screening Database (TSDB) (Army Directive 2014-05/AR 190-13), applicable installation, facility and area commander installation/facility access and local security policies and procedures (PBA Police Force and PBA Force Protection Section). All personnel must be cleared by the PBA Police prior to working on the installation. In addition to the changes otherwise authorized by the changes clause of this contract, should the Force Protection Condition (FPCON) at any individual facility or installation change, the Government may require changes in contractor security matters or procedures.

1.4.6 Utility Cutovers and Interruptions

a. Make utility cutovers and interruptions after normal working hours or on Saturdays, Sundays, and Government holidays. Conform to procedures required in paragraph WORK OUTSIDE REGULAR HOURS.

b. Ensure that new utility lines are complete, except for the connection, before interrupting existing service.

c. Interruption to water, sanitary sewer, storm sewer, telephone service, electric service, air conditioning, heating, fire alarm, compressed air, and are considered utility cutovers pursuant to the paragraph WORK OUTSIDE REGULAR HOURS.

1.5 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER

1.5.1 Procedure for Determination

This provision specifies the procedure for determination of time extensions for unusually severe weather in accordance with the contract clause entitled "Default (Fixed Price Construction)". In order for the Contracting Officer to award a time extension under this clause, the following conditions must be satisfied:

a. The weather experienced at the project site during the contract period must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month.

b. The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the Contractor.

1.5.1.1 Schedule of Anticipated Adverse Weather Days

The following schedule of monthly anticipated adverse weather delays is based on National Oceanic and Atmospheric Administration (NOAA) or similar

data for the project location and will constitute the base line for monthly weather time evaluations. The Contractor's progress schedule must reflect these anticipated adverse weather delays in all weather dependent activities.

MONTHLY ANTICIPATED ADVERSE WEATHER DELAY

WORK DAYS BASED ON (5) DAY WORK WEEK

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
9	6	6	5	4	3	2	1	2	1	4	6

1.5.1.2 Report Adverse Weather Delays

Upon acknowledgment of the Notice to Proceed (NTP) and continuing throughout the contract, the Contractor will record on the daily CQC report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the Contractor's scheduled workday. The number of actual adverse weather delay days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated in paragraph (b), above, the Contracting Officer will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days, and issue a modification in accordance with the contract clause entitled "Default (Fixed Price Construction)".

1.6 BASE REGULATIONS

The Contractor shall conform to all base regulations and directives pertaining to security, safety, debris removal, fire, traffic and personnel clearances, insofar as they pertain to the Contractor's activities on the Pine Bluff Arsenal (PBA). Contractor shall ensure conformance by all of his employees. Security requirements are subject to change. The Contractor can expect to be questioned and to present identification proof each time accessing the base. Entry to the Base under elevated security levels is limited to the main entrance for contractors. Entry may take as much as 60 minutes or more on some occasions due to emergencies or high levels of alert. The Contractor shall have a representative available on Base to receive all materials and equipment arriving on Base. The Contractor shall coordinate with the PBA Security Forces. Deliveries are to be coordinated with USACE's Construction Control Representative, Contracting Officer, and PBA Security (as applicable.) Contractor may not escort deliveries. Only DOD-ID holders may escort. Delivery of concrete shall be closely coordinated to assure adequate inspectors and escorts are available.

1.7 MATERIAL SHIPMENTS

The Government will not receive material shipments for construction projects and the Contractor shall not ship materials to himself addressed in care of Pine Bluff Arsenal or the Pine Bluff Arsenal Contracting Office. Receiving and storage of all construction shipments is entirely the responsibility of the Contractor. Shipments shall be addressed to the

Contractor who shall be responsible for their receipt, unloading, handling, and storage at the site. Government will not accept deliveries on behalf of the Contractor or his subcontractors or assume responsibility for security of materials, equipment, or supplies delivered to the site. Contractor shall protect and preserve materials, supplies, and equipment of every description (including property which may be Government furnished or owned) and work performed.

1.8 UTILITIES

Existing electrical service to the facilities shall be maintained until new electrical service is in place and ready for operation. Utility interruptions will be approved by the Contracting Officer. The Contractor shall submit an installation plan/schedule outage plan for all utility outages 30 days after notice to proceed. This plan will be reviewed by the Contracting Officer. The plan must be approved prior to implementing any work. The Contractor shall submit to the Contracting Officer a written request for such work at least two (2) weeks prior to the desired date. Telecommunication lines impacted by the construction and related work must be phased to ensure continuous service. Electrical, water, sewer, and gas systems shall not be interrupted without prior approval of the COR.

1.8.1 Excavation Permits

No formal dig permit is issued at Pine Bluff Arsenal. However, the Contractor shall submit an excavation request to the Pine Bluff Arsenal Master Planner no fewer than 14 calendar days and no more than 28 calendar days before excavation begins. The Contractor shall also notify Arkansas 811 (AR One Call) before excavation, in accordance with the Arkansas Underground Facilities Damage Prevention Act (§§ 14-271-101 through 14-271-115). Before any excavation, the Contractor shall perform a pipe and cable location survey using modern locating equipment appropriate for the type of utility. Use a signal-generating locator, such as a Goldak Gold Digger 4400, for metallic pipe and cable; a vibration generator, such as a Fuji Tecom PL-130 or RD-500, for nonmetallic pipe; and a snake with an attached generator for nonmetallic sewer pipe. Mark all located utilities on the ground and submit a sketch of their locations to the Contracting Officer for approval before excavation begins. The Contracting Officer will provide available information on known utilities. The Contractor is responsible, at no additional cost to the Government, for repairing any damage to known or unknown utilities resulting from failure to perform a thorough survey.

1.8.1.1 Excavation Adjacent to Underground Utilities

Digging within three feet of underground communication or electrical power cables shall be performed by hand until the cable is exposed. The Pine Bluff Arsenal DPW shall be notified 14 days prior to hand excavation. A base utilities representative will mark underground cable locations prior to excavation. Once the cable is exposed, mechanical excavation may be used if there is no chance of damaging the cable. Marking of utilities by the Base or its representatives does not relieve the Contractor of the responsibility to perform its own rigorous survey or repair at no additional cost to the government damage caused to existing utilities.

1.8.2 Utility Outage Requests and Utility Connection Repairs

The Contractor shall obtain written permission or approval from the Contracting Officer for any utility outage. The outage request shall be

submitted by the Contractor in accordance with the following paragraphs and shall indicate the proposed work and length of outage. Utility outages and connections required during the execution of the work that affect existing systems shall be arranged for at the convenience of the Government and shall be scheduled outside the regular working hours or on weekends. Contractor shall not be entitled to additional payment for utility outages and connections required to be performed outside the regular work hours.

1.8.2.1 Postponement of Outages

The Government reserves the right to postpone for 7 days, any scheduled outages. There shall be no outages when the outside temperature is expected to be below 35 degrees F.

1.8.2.2 Turning Utilities On and Off

Government personnel and/or the utility owner shall either perform and/or be present for all shutting off and turning on of valves and switches necessary to accomplish scheduled outage.

1.8.3 Water, Sewer, and Gas

Water outages will be performed by Base Civil Engineering. At least three (3) weeks written advance notice is required prior to shutting off water, sewer, or gas utilities. A service outage shall not exceed 4 hours unless otherwise approved by the Contracting Officer. Tapping of utilities without outages shall be accomplished where possible and shall be in requirements governing Pine Bluff Arsonal.

1.8.4 Electrical

At least two (2) weeks written advance notice is required prior to shutting off electrical utilities. Electrical primary power outages will be performed by PBA Public Works (870) 540-3301. The outage shall not exceed 4 hours. "Hot" line work will not be allowed.

1.8.5 Telecommunications

The Contractor shall not disturb communication wiring to facilities. Where such facilities require removal of communication equipment and wiring to accomplish the work involved, the Contractor shall notify the Contracting Officer at least five (5) work days in advance of the requirement, for scheduling such removals by the Government. The Contractor shall allow for the accomplishment of such removals by the telephone company or communications personnel for the systems they service. If construction activities damage any communication equipment or wiring, the Contractor shall restore services as soon as possible, but no later than 24-hours, and at no cost to the Government.

1.9 COMPLIANCE WITH ARNKANSAS DPEARTMENT OF HEALTH

All work performed under this contract shall conform to the requirements of the Arkansas Department of Health. The Contractor shall submit a plumbing system plan for approval to the Arkansas Department of Health. The Contractor shall pay all fees required to obtain plumbing permit.

1.10 SECURITY REQUIREMENTS

Contract Clause FAR 52.204-2 Security Requirements and Alternate II and the

following apply:

Dual citizenship is not permitted.

1.11 ARMY AND ARMY NATIONAL GUARD REQUIREMENTS AND RESTRICTIONS

1.11.1 3Rs Explosive Safety Education Training Certificate

All Contractor and subcontractor employees requiring access to Army or Army National Guard installations, facilities, and areas for the performance of a contract or subcontract must complete the 3Rs (Recognize, Retreat, Report) Explosives Safety Education Program training. Complete the training within 30 calendar days after the date of receipt of a written notice of award. The Contractor is responsible for ensuring that all subcontractor employees complete the training before access to the installation is required for performance of the subcontract. The Contractor is also responsible for ensuring that all contractor and subcontractor employees renew the training annually for the duration of the performance period of the contract or subcontract. Submit certificates of completion for each Contractor and subcontractor employee subject to this requirement to the Contracting Officer's Representative (COR) or to the Contracting Officer, if a COR is not assigned, within 5 calendar days after completion of training. 3Rs Explosives Safety Education Program training is available at the following website: https://www.denix.osd.mil/uxo/3rs-training/.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 20 00

PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SINGLE JOB PAYMENT ITEMS

Payment items for the work of this contract for which contract job payments will be made are listed in the SCHEDULE and described below. All costs for items of work, which are not specifically mentioned to be included in a particular job or unit price payment item, are included in the listed job item most closely associated with the work involved. The job price and payment made for each item listed constitutes full compensation for furnishing all labor, materials, and equipment, and performing any associated contractor quality control, environmental protection, meeting safety requirements, tests and reports, and for performing all work required for which separate payment is not otherwise provided.

1.1.1 Access Control Point – Design (BASE BID; CLIN 0001)

1.1.1.1 Payment

Payment will be made for costs associated with providing all design work and drawings, design reviews, site investigation, and other associated costs with design for Access Control Point.

1.1.1.2 Unit of Measure

Unit of measure: Job

1.1.2 Access Control Point – Construction (BASE BID; CLIN 0002)

1.1.2.1 Payment

Payment will be made for costs associated with providing a complete and usable Access Control Point for Pine Bluff Arsenal including associated site work and utilities.

1.1.2.2 Unit of Measure

Unit of measure: job.

1.1.3 Access Control Point - Pavement Demo (Option 01; CLIN 0003)

1.1.3.1 Payment

Payment will be made for demolition of existing pavement associated with existing Access Control Point and not used with new ACP. Option 01, CLIN 0003, includes all necessary related work and associated costs for demolition of existing pavement in the For Information Only Drawings (Reference CD101-CD103) at the Access Control Point site.

1.1.3.2 Unit of Measure

Unit of measure: job.

1.1.4 Access Control Point – Buildings Demo (Option 02; CLIN 0004)

1.1.4.1 Payment

Payment will be made for demolition of existing buildings associated with Access Control Point. Option 02, CLIN 0004, includes all necessary related work and associated costs for demolition of existing buildings in the For Information Only Drawings (Reference CD101-CD103) at the Access Control Point site.

1.1.4.2 Unit of Measure

Unit of measure: job.

1.1.5 Access Control Point – Truck Search Canopy (Option 03; CLIN 0005)

1.1.5.1 Payment

Payment will be made for an Outbound Lane Truck Search Canopy associated with Access Control Point. Option 03, CLIN 0005, includes all necessary related work and associated costs for building an Outbound Lane Truck Search Canopy prescribed in the For Information Only Drawings (S-131, S-132, S-231, S-331, S-332, A-001, A-131, A-231-A-232, CS105, ES103, EG101) at the Access Control Point site.

1.1.5.2 Unit of Measure

Unit of measure: job.

-- End of Section --

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2024) Safety -- Safety and Occupational Health (SOH) Requirements

1.2 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

View Location Map

Progress and Completion Pictures

1.3 VIEW LOCATION MAP

Submit, prior to or with the first digital photograph submittals, a sketch or drawing indicating the required photographic locations. Update as required if the locations are moved.

1.4 PROGRESS AND COMPLETION PICTURES

Construction Contractor shall provide high resolution, brochure quality construction completion photos with a panoramic view of the entire facility exterior. Photos shall be clear of construction caution tape, debris, vehicles, trash cans, dumpsters etc. Photos shall be provided in electronic file and delivered to National Program Manager prior to BOD or Construction Completion Date, whichever is earlier. Photographically document site conditions prior to start of construction operations. Provide monthly, and within one month of the completion of work, digital photographs, 1600x1200x24 bit true color minimum resolution in JPEG file format showing the sequence and progress of work. Take a minimum of 20 digital photographs each week throughout the entire project from a minimum of ten different viewpoints selected by the Contractor unless otherwise directed by the Contracting Officer. Submit with the monthly invoice one set of digital photographs in the agency construction management system of record, cumulative of all photos to date. Indicate photographs demonstrating environmental procedures. Provide photographs for each month in a separate monthly directory and name each file to indicate its location on the view location sketch. Also provide the view location sketch with the submission in the agency construction management system of record as a digital file. Include a date designator in file names. Photographs provided are for unrestricted use by the Government.

1.5 MINIMUM INSURANCE REQUIREMENTS

Provide the minimum insurance coverage required by FAR 28.307-2 Liability, during the entire period of performance under this contract. Provide other insurance coverage as required by State law.

1.6 CERTIFIED PAYROLL REPORTING REQUIREMENTS

All payrolls shall be submitted weekly to the Little Rock District via the CESWL Contractor Payroll Inbox (ceswl-contractorpayroll@usace.army.mil) or via an ePayroll system that is in compliance with FAR Clause 52.222-8. Payrolls must show the correct classification of each covered mechanic and laborer. In addition, the usual payment data on the payroll must include the Contract number and payroll number. It is the Prime Contractor's responsibility to retain a copy in their records of all social security numbers and addresses for their employees and their subcontractors' employees. Note: The SSNs should not be submitted to the government. Each weekly payroll, regular or supplemental, will be accompanied by a signed Form WH-347, entitled "Statement of Compliance" or Form DD 879 entitled "Statement of Compliance.

1.6.1 CONTRACTOR SUPPLY AND USE OF ELECTRONIC SOFTWARE FOR PROCESSING DAVIS-BACON ACT CERTIFIED PAYROL

In lieu of providing the certified payrolls in accordance with the above, the contractor may use a commercially available electronic system to process and submit certified payrolls electronically to the Government. The Davis-Bacon Act establishes the requirements for preparing, processing, and providing certified labor payrolls. The contractor shall be responsible for obtaining and providing access for all licenses and other services required to provide for receipt, processing, certifying, electronically transmitting to the Government, and storing weekly payrolls and other data required for the contractor to comply with Davis-Bacon Act and related statutes.

When the contractor uses an electronic Davis-Bacon Act payroll service, it shall be used to prepare, process, and maintain the relevant payrolls and basic records for all work under the construction contract. The electronic payroll service shall be capable of preserving the payroll and related basic records for the required three years after contract completion. The contractor shall obtain and provide electronic system access including electronic review to the Government, as required to comply with the Davis-Bacon Act and related statutes through the duration of the construction contract.

The contractor's provision and use of an electronic payroll processing system shall meet the following basic functional criteria:

1.6.1.1 commercially available;

1.6.1.2 compliant with appropriate Davis-Bacon Act payroll provisions in the FAR;

1.6.1.3 able to accommodate the required number of employees and subcontractors that will be employed under the contract;

1.6.1.4 capable of producing an Excel spreadsheet-compatible electronic output of weekly payroll records for export into an Excel spreadsheet to be imported into the contractor's mode of current construction management platform;

1.6.1.5 demonstrated security of data and data entry rights;

1.6.1.6 able to produce contractor-certified electronic versions of weekly payroll data;

1.6.1.7 able to identify erroneous entries and track the date/time of all versions of the certified Davis-Bacon Act payrolls submitted to the government over the life of the contract; and

1.6.1.8 capable of generating a durable record copy in a Compact Disc (CD) or Digital Versatile Disc (DVD) and Portable Document Format (PDF) File record of data from the system database at the end of the contract closeout. This durable record copy of data from the electronic payroll processing system shall be provided to the Government during contract closeout.

All contractor-incurred costs related to the contractor's provision and use of an electronic payroll processing service shall be included in the contractor's price for the overall work under the contract. The costs for Davis-Bacon Act compliance using electronic payroll processing services shall not be a separately bid or reimbursed item under this contract.

1.7 Field Office Overhead

Notice to Offerors: You must declare below the accounting practice that you apply to contracts to calculate field office overhead for all change orders, modifications, and requests for equitable adjustment. Pursuant to Federal Acquisition Regulation (FAR) Parts 31.105(d)(3) and 31.203(d)(1), an accounting practice that varies from modification to modification is not allowable. Select one of the following:

a. If you use Time Distribution Base for Per Diem Rate practice, see "Field Office Overhead - Per Diem Rate" listed below.

b. If you use Direct Cost Distribution Base for a Percentage Mark-up practice, see "Field Office Overhead - Percentage Markup", listed below.

c. If you choose Other Accounting Practice That is Allowed Under the FAR and That Uses a Single Distribution Base, you must describe the accounting practice in sufficient detail below to allow the Contracting Officer to determine what accounting practice is being utilized by your company and that it complies with the criteria for acceptable accounting practices as set out in FAR Parts 31.105(d)(3) and 31.203(d)(1).

d. Contractor must declare the Accounting Practice to apply to this contract, in writing, within 10 days after Notice to Proceed is received.

1.7.1 Field Office Overhead - Per Diem Rate

The Contracting Officer shall make an equitable adjustment and modify the contract in writing for any change to the contract, issued pursuant to the Changes clause or otherwise, for which the Government is responsible, and which causes either an increase or decrease in the Contractor's costs as to time or performance under the contract. Under such an equitable adjustment, the Contractor's field office overhead shall be an allowable

cost, in accordance with the Contractor's accounting practice as identified by the Contractor.

The Contractor shall declare which standard form of accounting practice it applies to field overhead costs: if a contractor indicates that it follows a per diem basis, no overhead percentage markup rate for office overhead costs shall be allowed.

Under such an equitable adjustment, the Contractor shall be reimbursed for field office overhead on a per diem basis when the completion of the contract is extended by reason of the change issued under any clause, except the Default clause, subject to the Contractor substantiating the variable expense by providing a detailed breakdown of its proposed increase or decrease of costs as required by the Contract Clause DFARS 252.236-7001 MODIFICATION OF PROPOSALS - PRICE BREAKDOWN. No payment of field office overhead on a per diem basis shall be allowed for any change when the completion of the contract is not extended by reason of the change.

1.7.2 Field Office Overhead - Percentage Markup

The Contracting Officer shall make an equitable adjustment and modify the contract in writing for any change to the contract, issued pursuant to the Changes clause or otherwise, for which the Government is responsible, and which causes either an increase or decrease in the Contractor's costs as to time or performance under the contract. Under such an equitable adjustment, the Contractor's field office overhead shall be an allowable cost, in accordance with the Contractor's accounting practice as identified by the Contractor.

The Contractor shall declare which standard form of accounting practice it applies to field overhead costs: if a contractor indicates that it follows a percentage basis, no per diem rate for office overhead costs shall be allowed.

Under such an equitable adjustment, payment of office overhead costs shall be allowed for any change on a percentage markup basis regardless of whether the completion of the contract is, or, is not, extended by reason of the change, except for modifications issued pursuant to the Default Clause. The Contractor shall provide a detailed breakdown of its proposed increase or decrease of costs as required by Contract Clause DFARS 252.236 - 7001 MODIFICATION OF PROPOSALS - PRICE BREAKDOWN.

1.8 Delegation of Authority

Submit separate letters of authority for each individual with delegated authority to negotiate and/or sign documents on behalf of the contractor for this contract. Provide name, title, telephone number, and email address for each individual and state their delegated authorities, to include authority limits where applicable, for the following items:

a. Serial Letters
b. Price Proposals
c. Authority to Negotiate (time and/or cost)
d. Contract Modifications
e. Prompt Payment Certification
f. Certified Payroll Documents
g. Safety incident notices and forms
h. CPARS performance evaluations

i. Release of Claims
j. Delegation of Competent Person and/of Qualified Person

Each letter submitted shall include the individual's acknowledgement of their delegated authority and shall include the individual's handwritten signature and electronic signature.

Submit the letters within 10 days after receipt of Notice to Proceed.

Update the authority delegations, in writing, when changes in personnel or delegated authority occur.

1.9 SUPERVISION

1.9.1 Superintendent Qualifications

Provide project superintendent with a minimum of 10 years experience in construction with at least 5 of those years as a superintendent on projects similar in size and complexity. The individual must be familiar with the requirements of EM 385-1-1 and have experience in the areas of hazard identification and safety compliance. The individual must be capable of interpreting a critical path schedule and construction drawings. The qualification requirements for the alternate superintendent are the same as for the project superintendent. The Contracting Officer may request proof of the superintendent's qualifications at any point in the project if the performance of the superintendent is in question.

For projects where the superintendent is permitted to also serve as the Quality Control (QC) Manager as established in Section 01 45 00 QUALITY CONTROL, the superintendent must have qualifications in accordance with that section.

1.9.2 Minimum Communication Requirements

Have at least one qualified superintendent, or competent alternate, capable of reading, writing, and conversing fluently in the English language, on the job-site at all times during the performance of Contract work. In addition, if a Quality Control (QC) representative is required on the Contract, then that individual must also have fluent English communication skills.

1.9.3 Duties

The project superintendent is primarily responsible for managing subcontractors and coordinating day-to-day production and schedule adherence on the project. The superintendent is required to attend Red Zone meetings, partnering meetings, and quality control meetings. The superintendent or qualified alternative must be on-site at all times during the performance of this contract until the work is completed and accepted.

1.9.4 Non-Compliance Actions

The Project Superintendent is subject to removal by the Contracting Officer for non-compliance with requirements specified in the contract and for failure to manage the project to ensure timely completion. Furthermore, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders is acceptable as the subject

of claim for extension of time or excess costs or damages by the Contractor.

1.10 PRECONSTRUCTION CONFERENCE

Prior to start of construction, a pre-construction conference will be scheduled by the authorized representative of the Contracting Officer. The purpose of the preconstruction conference is to discuss and review the contract, its requirements, and general administrative processes and procedures as well as define contractual lines of authority. The purpose of the MUC is to develop a mutual understanding of more in depth administrative requirements of the Contract including but not limited to: daily reporting, invoicing, value engineering, safety, base-access, outage requests, hot work permits, schedule requirements, quality control, schedule of prices or earned value report, shop drawings, submittals, cybersecurity, prosecution of the work, government acceptance, final inspections and contract close-out and the processes for joint risk management between the Contractor and Government. Contractor must present and discuss their basic approach to scheduling the construction work and any required phasing. It is preferred the major subcontractors also be present for the preconstruction conference.

1.10.1 Attendees

Contractor attendees must include the Project Manager, Superintendent, Site Safety and Health Officer (SSHO), Quality Control Manager and major subcontractors.

1.11 FACILITY TURNOVER PLANNING MEETINGS (Red Zone Meetings)

Meet with the Government to identify strategies to ensure the project is carried to expeditious closure and turnover to the Client. Start planning the turnover process at the Pre-Construction Conference meeting with a discussion of the Red Zone process and convene at regularly scheduled Red Zone Meetings beginning at approximately 75 percent of project completion. Include the following in the facility Turnover effort:

1.11.1 Red Zone Checklist

a. Contracting Officer's Technical Representative (COTR) will provide the Contractor a copy of the Red Zone Checklist template.

b. Prior to 75 percent completion, modify the Red Zone Checklist template by adding or deleting critical activities applicable to the project and assign planned completion dates for each activity. Submit the modified Red Zone Checklist to the Contracting Officer. The Contracting Officer may request additional activities be added to the Red Zone Checklist at any time as necessary.

1.11.2 Meetings

a. Conduct regular Red Zone Meetings beginning at approximately 75 percent project completion, or three to six months prior to Beneficial Occupancy Date (BOD), whichever comes first.

b. The Contracting Officer will establish the frequency of the meetings, which is expected to increase as the project completion draws nearer. At the beginning, Red Zone meetings may be every two weeks then increase to weekly towards the final month of the project.

c. Using the Red Zone Checklist as a Plan of Action and Milestones (POAM) and basis for discussion, review upcoming critical activities and strategies to ensure work is completed on time. During the Red Zone Meetings discuss with the COTR any upcoming activities that require Government involvement.

d. Maintain the Red Zone Checklist by documenting the actual completion dates as work is completed and update the Red Zone Checklist with revised planned completion dates as necessary to match progress. Distribute copies of the current Red Zone Checklist to attendees at each Red Zone Meeting.

1.12 PARTNERING

To most effectively accomplish this Contract, the Contractor and Government must form a cohesive partnership with the common goal of drawing on the strength of each organization in an effort to achieve a successful project that without safety mishaps, conforming to the Contract, within budget and on schedule. The partnering team must consist of personnel from both the Government and Contractor including project level and corporate level leadership positions. Key Personnel from the supported command, end user, Contractor, key subcontractors and the Designer of Record are required to participate in the Partnering process.

1.12.1 Facilitated (Formal) Partnering

a. Within 35 calendar days after award and prior to the start of work, host a Formal Partnering session with key personnel from the project team including both Contractor and Government personnel. All costs associated with the Partnering session including the third-party independent Facilitator Consultant, meeting room and other incidental items are the responsibility of the Contractor.

b. Before the Facilitated (Formal) Partnering session, coordinate with the Facilitator all requirements for incidental items (such as audio-visual equipment, easels, flipchart paper, colored markers, note pads, pens/pencils, colored flash cards) and have these items available at the Partnering session. Provide copies of any documents required for distribution to all attendees. Participants will bear their own costs for meals, lodging and transportation associated with Partnering.

c. The Initial Partnering Session must be a duration of one day and be held at a location off base as agreed to by the Contracting Officer. Partnering session may take place concurrently with the Meeting.

d. Facilitator must be experienced in conducting corporate Partnering sessions and must be a third-party independent facilitating consultant - not an employee of the Contractor. The Facilitator is responsible for leading all aspects of the Partnering session necessary to achieve the Partnering goal.

e. An outcome of the Partnering session must be an escalation matrix agreed upon by both the Government and Contractor, which identifies key Government and Contractor decision makers by name and anticipated decision durations.

f. Host follow-on Partnering Sessions at three- to six-month intervals or more frequently if needed and lasting generally a half day or less. Attendees need only be those required to resolve current issues. The same Facilitator used in the Initial Partnering session must lead the follow-on sessions unless an alternative is permitted by the Contractor

Officer. All costs associated with follow-on Partnering sessions are the responsibility of the Contractor.

1.13 MOBILIZATION

Mobilize to the jobsite within 60 calendar days after contract award. Mobilize is defined as having equipment AND having a physical presence of at least one person from the contractor's team on the jobsite.

1.14 CONFIRMATION NOTICES

Successful Design-Build Contractor to provide records of all meetings, site visits, review conferences, in-progress work sessions, discussions, verbal directions, and any other interactions in which the Design-Build Contractor, or his/her representative(s),participate on matters relative to the project. Such records, which are typically identified as "Confirmation Notices," must be numbered sequentially and must fully identify participating personnel, subject(s) discussed, and any guidance given or conclusions reached.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 32 01.00 10

PROJECT SCHEDULE
08/23, CHG 1: 08/24

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AACE INTERNATIONAL (AACE)

AACE 29R-03	(2011) Forensic Schedule Analysis
AACE 52R-06	(2006) Time Impact Analysis - As Applied in Construction
AACE 84R-13	(2015) Planning and Accounting for Adverse Weather

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 67-17	(2017) Schedule Delay Analysis

U.S. ARMY CORPS OF ENGINEERS (USACE)

ER 1-1-11	(2017) Administration -- Project Schedules

1.2 SUBMITTALS

Government approval is required for submittals with a "G" or "GA" classification. Submittals not having a "G" or 11 8 11 classification are for information only.When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Project Scheduler

Qualifications; G Preliminary

Project Schedule; G Initial

Project Schedule; G Periodic

Schedule Update; G

1.3 PROJECT SCHEDULER QUALIFICATIONS

Designate an authorized representative to be responsible for the preparation of the schedule and all required updating and production of reports. The Designated Project Scheduler must have prepared and maintained at least three previous construction schedules for projects of similar size and complexity to this contract, using Primavera P6. Representative must have a comprehensive knowledge of CPM scheduling

principles and application.

PART 2 PRODUCTS

2.1 SOFTWARE

The scheduling software utilized to produce and update the schedules required herein must be capable of meeting all requirements of this specification.

2.1.1 Government Default Software

The Government uses Primavera P6. Ensure exported schedule files are compatible with the version of P6 used by the Government.

2.1.2 Contractor Software

Scheduling software used by the contractor must be commercially available from the software vendor for purchase with vendor software support agreements available. The software routine used to create the required SDEF file must be created and supported by the software manufacturer.

2.1.2.1 Primavera

If Primavera P6 is selected for use, provide the "xer" export file in a version of P6 importable by the Government system. Verify at the SEKO meeting which version of P6 is in use by the Government.Export the schedule in a version of P6 no newer than that used by the Government.

2.1.2.2 Other Than Primavera

If the Contractor chooses software other than Primavera P6, that is compliant with this specification, provide for the Government's use two licenses, two computers, and training for two Government employees in the use of the software. These computers will be stand-alone and not connected to Government network. Computers and licenses will be returned at project completion.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

Prepare for approval a Project Schedule, as specified herein, pursuant to RFO 52.236-15 Schedules for Construction Contracts. Show in the schedule the proposed sequence to perform the work and dates contemplated for starting and completing all schedule activities. The scheduling of the entire project is required. The scheduling of design and construction is the responsibility of the Contractor. Contractor management personnel must actively participate in its development. Designers, Subcontractors, and suppliers working on the project must also contribute in developing and maintaining an accurate Project Schedule. Provide a schedule that is a forward planning as well as a project monitoring tool. Use the Critical Path Method (CPM) of network calculation to generate all Project Schedules. Prepare each Project Schedule using the Precedence Diagram Method (PDM).

3.1.1 Scheduling Expectations Kickoff Meeting(SEKO)

In conjunction with the post award conference or pre construction

conference the Government and the Contractor will hold a separate and distinct Scheduling Expectations Kickoff Meeting(SEKO). The intent of this meeting is for the Government to review with the contractor the requirements of the scheduling specification, communicate the Government's expectations regarding schedule development and management, and answer any questions the Contractor may have regarding the schedule requirements.

3.2 BASIS FOR PAYMENT AND COST LOADING

The schedule is the basis for determining contract earnings during each update period and therefore the amount of each progress payment. The aggregate value of all activities coded to a contract CLIN must equal the value of the CLIN. Match the progress payment "Pay Period Thru" date in RMS to the schedule data date.

3.2.1 Activity Cost Loading

Activity cost loading must be reasonable and without front-end loading. Activities with a negative cost loading is not allowed. Provide additional documentation to demonstrate reasonableness if requested by the Contracting Officer.

3.2.2 Cost Loading of Submittals

No costs are to be assigned to activities for the preparation, review, or approval of submittals, except as described under paragraph COST LOADING OF CLOSEOUT ACTIVITIES, paragraph AS-BUILT DRAWINGS, design submittals, and paragraph O&M MANUALS.

3.2.3 Withholdings/ Payment Rejection

Failure to meet the requirements of this specification may result in the disapproval of the preliminary, initial, or periodic schedule updates and subsequent rejection of payment requests until compliance is met.

In the event that the Contracting Officer directs schedule revisions and those revisions have not been included in subsequent Project Schedule revisions or updates, the Contracting Officer may withhold 10 percent of pay request amount from each payment period until such revisions to the project schedule have been made.

3.3 PROJECT SCHEDULE DETAILED REQUIREMENTS

3.3.1 Level of Detail Required

Develop the Project Schedule to the appropriate level of detail to address major milestones and to allow for satisfactory project planning and execution. Failure to develop the Project Schedule to an appropriate level of detail will result in its disapproval. The Contracting Officer will consider, but is not limited to, the following characteristics and requirements to determine appropriate level of detail:

3.3.2 Activity Durations

Reasonable activity durations are those that allow the progress of ongoing activities to be accurately determined between update periods. Non-procurement activities Original Durations (OD) are not to exceed 20 workdays or 30 calendar days.

3.3.3 Design and Permit Activities

Include design and permit activities with the necessary conferences and follow-up actions and design package submission dates. Include the design schedule in the project schedule, showing the sequence of events involved in carrying out the project design tasks within the specific contract period. Provide a detailed level of scheduling sufficient to identify all major design tasks, including those that control the flow of work. Also include review and correction periods associated with each item.

3.3.4 Procurement Activities

Include in the schedule activities associated with the critical submittals and their approvals, procurement, fabrication, and delivery of long lead materials, equipment, fabricated assemblies, and supplies. Long lead procurement activities are those with an anticipated procurement sequence of over 90 calendar days.

3.3.5 Mandatory Activities

Include the following activities in the initial project schedule and all updates.

a. Submission, review and acceptance of SD-01 Preconstruction Submittals (individual activity for each).

b. Submission, review and acceptance of design packages.

c. Submission of mechanical/electrical/information systems layout drawings.

d. Submission and approval of O & M manuals.

e. Submission and approval of as-built drawings.

f. Submission and approval of DD1354 data and installed equipment lists.

g. Submission and approval of testing and air balance (TAB).

h. Submission of TAB specialist design review report.

i. Submission and approval of fire protection specialist.

j. Submission and approval of Building Commissioning Plan, Controls testing plan, test data, and reports: Develop the schedule logic associated with testing and commissioning of mechanical systems to a level of detail consistent with the contract commissioning requirements. All tasks associated with building testing and commissioning will be completed prior to submission of building commissioning report and subsequent contract completion.

   These activities may include but are not limited to: air and water balancing, building commissioning -functional performance testing, controls testing, and performance verification testing. Include other systems testing, if required. Include additional commissioning requirements noted elsewhere in the Contract as required in the schedule and discuss during the SEKO meeting, noted in paragraph SCHEDULING EXPECTATIONS KICKOFF MEETING (SEKO).

k. Establish permanent power.

l. Contractor's pre-final inspection.

m. Correction of punch list from Contractor's pre-final inspection.

n. Government's pre-final inspection.

o. Correction of punch list from Government's pre-final inspection.

p. Final inspection.

3.3.6 Government Activities

Show in schedule, Government and other agency activities that could impact progress. These activities include, but are not limited to acceptance, design reviews, environmental permit approvals by State regulators, inspections, utility tie-in, Government Furnished Equipment (GFE) and Notice to Proceed (NTP) for phasing requirements.

3.3.7 Standard Activity Coding Dictionary

Use the activity coding structure defined in the Standard Data Exchange Format (SDEF) in ER 1-1-11. This exact structure is mandatory. Develop and assign all Activity Codes to activities as detailed herein.

The SDEF format is as follows:

Field	Activity Code	Length	Description
1	WRKP	3	Workers per day
2	RESP	4	Responsible party
3	AREA	4	Area of work
4	MODF	6	Modification Number
5	BIDI	6	Bid Item (CLIN)
6	PHAS	2	Phase of work
7	CATW	1	Category of work
8	FOW	20	Feature of work*
*Some systems require that FEATURE OF WORK values be placed in several activity code fields. The notation shown is for Primavera P6. Refer to the specific software guidelines with respect to the FEATURE OF WORK field requirements.			

3.3.7.1 Workers Per Day (WRKP)

Assign Workers per Day for all field construction or direct work activities, if directed by the Contracting Officer. Workers per day is

based on the average number of workers expected each day to perform a task for the duration of that activity.

3.3.7.2 Responsible Party Coding (RESP)

Assign responsibility code for all activities to the Prime Contractor, Subcontractor(s) or Government agency(ies) responsible for performing the activity.

a. Activities coded with a Government Responsibility code include, but are not limited to: Government approvals, Government design reviews, environmental permit approvals by State regulators, Government Furnished Property/Equipment (GFP) and Notice to Proceed (NTP) for phasing requirements.

b. Activities cannot have more than one Responsibility Code. Examples of acceptable activity code values are: DOR (for the designer of record); ELEC (for the electrical subcontractor); MECH (for the mechanical subcontractor); and GOVT (for USACE)

3.3.7.3 Area of Work Coding (AREA)

Assign Work Area code to activities based upon the work area in which the activity occurs. Define work areas based on resource constraints or space constraints that would preclude a resource, such as a particular trade or craft work crew from working in more than one work area at a time due to restraints on resources or space. Examples of Work Area Coding include different areas within a floor of a building, different floors within a building, and different buildings within a complex of buildings.
Activities cannot have more than one Work Area Code.

3.3.7.4 Modification Number (MODF)

Assign a Modification Number Code to any activity or sequence of activities added to the schedule as a result of a Contract Modification, when approved by Contracting Officer. Key all Code values to the Government's modification numbering system. An activity can have only one Modification Number Code.

3.3.7.5 Bid Item Coding (BIDI)

Assign a Bid Item Code to all activities using the Contract Line Item Number (CLIN) to which the activity belongs, even when an activity is not cost loaded. An activity can have only one BIDI Code.

3.3.7.6 Phase of Work Coding (PHAS)

Assign Phase of Work Code to all activities. Examples of phase of work are design phase, procurement phase and construction phase. Each activity can have only one Phase of Work code.

a. Code proposed fast track design and construction phases proposed to allow filtering and organizing the schedule by fast track design and construction packages.

b. If the contract specifies phasing with separately defined performance periods, identify a Phase Code to allow filtering and organizing the schedule accordingly.

3.3.7.7 Category of Work Coding (CATW)

Assign a Category of Work Code to all activities. Category of Work Codes include, but are not limited to design, design submittal, design reviews, review conferences, permits, construction submittal, procurement, fabrication, weather sensitive installation, non-weather sensitive installation, start-up, and testing activities. Each activity can have no more than one Category of Work Code.

3.3.7.8 Feature of Work Coding (FOW)

Assign a Feature of Work Code to appropriate activities based on the Definable Feature of Work to which the activity belongs based on the approved QC plan.

Definable Feature of Work is defined in Section 01 45 00 QUALITY CONTROL. An activity can have only one Feature of Work Code.

3.3.8 Contract Milestones and Constraints

Milestone activities are to be used for significant project events including, but not limited to, project phasing, project start and end activities, or interim completion dates. The use of artificial float constraints such as "zero free float" or "zero total float" are prohibited.

Mandatory constraints that ignore or affect network logic are prohibited. No constrained dates are allowed in the schedule other than those specified herein. Submit additional constraints to the Contracting Officer for approval on a case by case basis.

3.3.8.1 Project Start Date Milestone and Constraint

The first activity in the project schedule must be a start milestone titled "NTP Acknowledged," which must have a "Start On" constraint date equal to the date that the NTP is acknowledged.

3.3.8.2 End Project Finish Milestone and Constraint

The last activity in the schedule must be a finish milestone titled "End Project."

Constrain the project schedule to the Contract Completion Date in such a way that if the schedule calculates an early finish, then the float calculation for "End Project" milestone reflects positive float on the longest path. If the project schedule calculates a late finish, then the "End Project" milestone float calculation reflects negative float on the longest path.

3.3.8.3 Interim Completion Dates and Constraints

Constrain contractually specified interim completion dates to show negative float when the calculated late finish date of the last activity in that phase is later than the specified interim completion date.

3.3.8.3.1 Start Phase

Use a start milestone as the first activity for a project phase. Call the start milestone "Start Phase X" where "X" refers to the phase of work.

3.3.8.3.2 End Phase

Use a finish milestone as the last activity for a project phase. Call the finish milestone "End Phase X" where "X" refers to the phase of work.

3.3.9 Adverse Weather

Ensure anticipated adverse weather is accounted for in the Project Schedule. AACE 84R-13 provides methodologies for techniques in planning for adverse weather. The preferred methodology is the use of a weather calendar. If a method other than a weather calendar is proposed, discuss the reason during the SEKO meeting.

3.3.10 Calendars

Schedule activities on a Calendar to which the activity logically belongs. Develop calendars to accommodate any contract defined work period such as a 7-day calendar for Government Acceptance activities, concrete cure times, etc. Develop the default Calendar to match the physical work plan with non-work periods identified including weekends and holidays. Develop Seasonal Calendar(s) and assign to seasonally affected activities as applicable.

If a weather calendar is used its implementation and execution is to be in accordance with AACE 84R-13

3. 3 .11 Open Ended Logic

Only two open ended activities are allowed: the first activity "NTP Acknowledged" is to have no predecessor logic, and the last activity -"End Project" is to have no successor logic. Except as noted above, each activity must have at least a start-to-start or finish-to-start relationship with its predecessor and a finish-to-finish or finish-to-start relationship with its successor.

Predecessor open ended logic may be allowed in a time impact analyses upon the Contracting Officer's approval.

3.3.12 Default Progress Data Disallowed

Actual Start and Finish dates must not automatically update with default mechanisms included in the scheduling software. Updating of the percent complete and the remaining duration of any activity must be independent functions. Disable program features that calculate one of these parameters from the other. Activity Actual Start (AS) and Actual Finish (AF) dates assigned during the updating process must match those dates provided in the Contractor Quality Control Reports. Failure to document the AS and AF dates in the Daily Quality Control report will result in disapproval of the Contractor's schedule.

3.3.13 Out-of-Sequence Progress

Activities that have progressed before all preceding logic has been satisfied (Out-of-Sequence Progress) will be allowed only on a case-by-case basis subject to approval by the Contracting Officer. Propose logic corrections to eliminate out of sequence progress or justify not changing the sequencing for approval prior to submitting an updated project schedule. Address out of sequence progress or logic changes in the Narrative Report and in the periodic schedule update meetings.

3.3.14 Added and Deleted Activities

Do not delete activities from the project schedule or add new activities to the schedule without approval from the Contracting Officer. Activity ID and description changes are considered new activities and cannot be changed without Contracting Officer approval.

3.3.15 Original Durations

Activity Original Durations (OD) must be reasonable to perform the work item. OD changes are prohibited unless justification is provided and approved by the Contracting Officer.

3.3.16 Leads, Lags, and Start to Finish Relationships

Lags must be reasonable as determined by the Government and not used in place of realistic original durations, must not be in place to artificially absorb or create float, or to replace proper schedule logic.

a. Leads (negative lags) are prohibited.

b. Start to Finish (SF) relationships are prohibited.

3.3.17 Retained Logic

Schedule calculations must retain the logic between predecessors and successors ("retained logic'' mode) even when the successor activity(s) starts and the predecessor activity(s) has not finished (out-of-sequence progress). Software features that in effect sever the tie between predecessor and successor activities when the successor has started and the predecessor logic is not satisfied ("progress override") are not be allowed.

3.3.18 Percent Complete

Update the percent complete for each activity started, based on the realistic assessment of earned value. Activities which are complete but for remaining minor punch list work and which do not restrain the initiation of successor activities may be declared 100 percent complete to allow for proper schedule management. Budgeted cost of activity is to be reduced by the amount needed to correct deficiency. The activity referenced in paragraph COST LOADING of CLOSEOUT ACTIVITIES must have its budgeted cost increased by this amount.

3.3.19 Remaining Duration

Update the remaining duration for each activity based on the number of estimated workdays it will take to complete the activity. Remaining duration may not mathematically correlate with percentage found under paragraph entitled Percent Complete. The remaining duration for unstarted activities are not to be less than its orginal duration.

3.3.20 Cost Loading of Closeout Activities

Cost load the "Correction of punch list from Government pre-final inspection" activity(ies) not less than 1 percent of the present contract value. Activity(ies) may be declared 100 percent complete upon the Government's verification of completion and correction of all punch list work identified during Government pre-final inspection(s).

3.3.20.1 As-Built Drawings

If there is no separate contract line item (CLIN) for as-built drawings, cost load the "Submission and approval of as-built drawings" activity not less than $35,000 or 1 percent of the present contract value, which ever is greater, up to $200,000. Activity will be declared 100 percent complete upon the Government's approval.

3.3.20.2 0 & M Manuals

Cost load the "Submission and approval of O & M manuals" activity not less than $20,000. Activity will be declared 100 percent complete upon the Government's approval of all O & M manuals.

3.3.21 Early Completion Schedule and the Right to Finish Early

An Early Completion Schedule is an Initial Project Schedule (IPS) that indicates all scope of the required contract work will be completed before the contractually required completion date.

a. No IPS indicating an Early Completion will be accepted without being fully resource-loaded (including crew sizes and hours) and the Government agreeing that the schedule is reasonable and achievable.

b. The Government is under no obligation to accelerate work items it is responsible for to ensure that the early completion is met nor is it responsible to modify incremental funding (if applicable) for the project to meet the contractor's accelerated work.

3.4 PROJECT SCHEDULE SUBMISSIONS

Provide the submissions as described below. The data reports and network diagrams required for each submission are contained in paragraph SUBMISSION REQUIREMENTS. If the Contractor fails or refuses to furnish the information and schedule updates as set forth herein, the Contractor will be deemed not to have provided an estimate upon which a progress payment can be made.

Review comments made by the Government on the schedule(s) do not relieve the Contractor from compliance with requirements of the Contract Documents.

3.4.1 Preliminary Project Schedule Submission

Within 15 calendar days after the NTP is acknowledged, submit the Preliminary Project Schedule defining the planned operations detailed for the first 90 calendar days for approval. The approved Preliminary Project Schedule will be used for payment purposes not to exceed 90 calendar days after NTP. Completely cost load the Preliminary Project Schedule to balance the contract award CLINS shown on the Price Schedule. The Preliminary Project Schedule may be summary in nature for the remaining performance period. It must be early start and late finish constrained and logically tied as specified. The Preliminary Project Schedule forms the basis for the Initial Project Schedule specified herein and must include all of the required plan and program preparations, submissions and approvals identified in the contract (for example, Quality Control Plan, Safety Plan, and Environmental Protection Plan) as well as design activities, planned submissions of all early design packages, permitting activities, design review conference activities, and other non-construction

activities intended to occur within the first 90 calendar days. Government acceptance of the associated design package(s) and all other specified Program and Plan approvals must occur prior to any planned construction activities. Code activities that are summary in nature, after the first 90 calendar days, with the following activity codes: Bid Item (CLIN) code (BIDI), Responsibility Code (RESP), and Feature of Work code (FOW).

3.4.2 Initial Project Schedule Submission

Submit the Initial Project Schedule for approval within 42 calendar days after notice to proceed is issued. The schedule must demonstrate a reasonable and realistic sequence of activities which represent all work through the entire contract performance period. Include in the design-build schedule detailed design and permitting activities, including but not limited to identification of individual design packages, design submission, reviews and conferences; permit submissions and any required Government actions; and long lead item acquisition prior to design completion. Also cover in the initial design-build schedule the entire construction effort with as much detail as is known at the time but, as a minimum, include all construction start and completion milestones, and detailed construction activities through the dry-in, including all activity coding and cost loading. Include the remaining construction, including cost loading, but it may be scheduled summary in nature. As the design proceeds and design packages are developed, fully detail the remaining construction activities concurrent with the monthly schedule updating process. Constrain construction activities by Government acceptance of associated designs. When the design is complete, incorporate into the then approved schedule update all remaining detailed construction activities that are planned to occur after the dry-in milestone. No payment will be made for work items not fully detailed in the Project Schedule.

3.4.2.1 Design Package Schedule Submission

With each design package submitted to the Government, submit a fragnet schedule extracted from the then current Preliminary, Initial or Updated schedule which covers the activities associated with that Design Package including construction, procurement and permitting activities.

3.4.3 Periodic Schedule Updates

Update the Project Schedule on a regular basis, monthly at a minimum. Provide a draft Periodic Schedule Update for review at the schedule update meetings as prescribed in the paragraph PERIODIC SCHEDULE UPDATE MEETINGS. These updates will enable the Government to assess Contractor's progress. Update the schedule to include detailed construction activities as the design progresses, but not later than the submission of the final un-reviewed design submission for each separate design package. The Contracting Officer may require submission of detailed schedule activities for any distinct construction that is started prior to submission of a final design submission if such activity is authorized.

a. Update information including Actual Start Dates (AS), Actual Finish Dates (AF), Remaining Durations (RD), and Percent Complete. Updated information is subject to the approval of the Government at the meeting.

b. AS and AF dates must match the date(s) reported on the Contractor's Quality Control Report for an activity start or finish.

3.5 SUBMISSION REQUIREMENTS

Submit the following items for the Preliminary Schedule, Initial Schedule, and every Periodic Schedule Update throughout the life of the project:

3.5.1 Electronic Scheduling Data

Provide electronic scheduling data containing the current project schedule and all previously submitted schedules in the format of the scheduling software (e.g.. xer). Also include the Narrative Report and all required Schedule Reports. The electronic file is to identify the type of schedule (Preliminary, Initial, Update), full contract number, Data Date and schedule file name. Each schedule must have a unique file name and use project specific settings. The file naming convention is to be determined at SEKO meeting.

3.5.2 Narrative Report

Provide a Narrative Report with each schedule submission. The Schedule Narrative Report is a "stand alone" report in PDF or Word format. Title the report "Schedule Narrative Report". Show the Report date, schedule name, and contract number on the first page. Indicate who is responsible for the schedule update and narrative report. Provide a brief description of the Project Scope. The Narrative Report is expected to communicate to the Government the thorough analysis of the schedule output and the plans to compensate for problems, either current or potential, which are revealed through that analysis. Include the following information at a minimum in the Narrative Report:

a. Identify and discuss the work scheduled to start in the next update period.

b. Describe activities along the critical path in addition to activities on the next float path after the critical path.

c. Describe current and anticipated problem areas, delaying factors and their impact, and an explanation of corrective actions taken or required to be taken. Identify the party responsible for delay, if applicable.

d. Identify and explain why activities, based on their calculated late dates, should have either started or finished during the update period but did not.

e. Identify and discuss all schedule changes by activity ID and activity name including what specifically was changed and why the change was needed. Include at a minimum new and deleted activities, logic changes, duration changes, calendar changes, lag changes, resource changes, and actual start and finish date changes.

f. Identify and discuss out-of-sequence work.

g. If the longest path changes from a monthly update to the next, provide an explanation of the factors driving the change.

h. Respond to USACE Schedule Review Comments from the previous update(s).

3.5.3 Schedule Reports

The format, filtering, organizing, and sorting for each schedule report will be as directed by the Contracting Officer. Typically, reports contain Activity Numbers, Activity Description, Original Duration, Remaining Duration, Early Start Date, Early Finish Date, Late Start Date, Late Finish Date, Total Float, Actual Start Date, Actual Finish Date, and Percent Complete. Provide the reports electronically in .pdf format. The following lists typical reports that will be requested:

3.5.3.1 Activity Report

List of all activities sorted according to activity number.

3.5.3.2 Logic Report

List of detailed predecessor and successor activities for every activity in ascending order by activity number.

3.5.3.3 Total Float Report

A list of all incomplete activities sorted in ascending order of total float. List activities which have the same amount of total float in ascending order of Early Start Dates. Do not show completed activities on this report.

3.5.3.4 Earnings Report by CLIN

A compilation of the Total Earnings on the project from the NTP to the data date, which reflects the earnings of activities based on the agreements made in the schedule update meeting defined herein. Provided a complete schedule update has been furnished, this report serves as the basis of determining progress payments. Group activities by CLIN number and sort by activity number. Provide a total CLIN percent earned value, CLIN percent complete, and project percent complete. The printed report must contain the following for each activity: the Activity Number, Activity Description, Original Budgeted Amount, Earnings to Date, Earnings this period, Total Quantity, Quantity to Date, and Percent Complete (based on cost).

3.5.3.5 Scheduling and Leveling Report

Provide a Scheduling/Leveling Report generated from the current project schedule being submitted.

3.5.4 Network Diagram

The Network Diagram is required for the Preliminary, Initial and Periodic Updates. Depict and display the order and interdependence of activities and the sequence in which the work is to be accomplished. The Contracting Officer will use, but is not limited to, the following conditions to review compliance with this paragraph:

3.5.4.1 Continuous Flow

Show a continuous flow from left to right with no arrows from right to left. Show the activity number, description, duration, and estimated earned value on the diagram.

3.5.4.2 Project Milestone Dates

Show dates on the diagram for start of project, any contract required interim completion dates, and contract completion dates.

3.5.4.3 Critical Path

Show all activities on the critical path. The critical path is defined as the longest path.

3.5.4.4 Grouping and Sorting

Group and sort activities as directed to assist in the understanding of the activity sequence. Typically, this flow will group activities by major elements of work, category of work, work area and/or responsibility.

3.5.4.5 Cash Flow/ Schedule Variance Control (SVC) Diagram

With each schedule submission, provide a SVC diagram showing 1) Cash Flow S-Curves indicating planned project cost based on projected early and late activity finish dates, and 2) Earned Value to-date.

3.6 PERIODIC SCHEDULE UPDATE

3.6.1 Periodic Schedule Update Meetings

Conduct periodic schedule update meetings for the purpose of reviewing the proposed Periodic Schedule Update, Narrative Report, Schedule Reports, and progress payment. Conduct meetings at least monthly within five days of the proposed schedule data date. Provide a computer with the scheduling software loaded and a projector which allows all meeting participants to view the proposed schedule during the meeting. The Contractor's authorized scheduler must organize, group, sort, filter, perform schedule revisions as needed and review functions as requested by the Contractor and/or Government. The Contractor scheduler must attend in person unless virtual attendance is approved by Contracting Officer. The meeting is a working interactive exchange which allows the Government and Contractor the opportunity to review the updated schedule on a real time and interactive basis. The meeting will last no longer than 8 hours. Submit schedule file and narrative to the Government a minimum of two workdays in advance of the meeting. The Contractor's Project Manager must attend the meeting with the authorized representative of the Contracting Officer. Superintendents, foremen and major subcontractors must attend the meeting as required to discuss the project schedule and work. Following the schedule update meeting, make corrections to the schedule and resubmit, following the required schedule naming convention. Include only those changes approved by the Government in the schedule review meeting. Only approved schedules may be used to generate invoices for payment.

3.6.2 Update Submission Following Progress Meeting

Submit the complete Periodic Schedule Update of the Project Schedule containing **all** approved progress, revisions, and adjustments, pursuant to paragraph SUBMISSION REQUIREMENTS not later than 4 workdays after the periodic schedule update meeting.

3.7 WEEKLY PROGRESS MEETINGS

Conduct a weekly meeting with the Government (or as otherwise mutually

agreed to) between the meetings described in paragraph entitled PERIODIC SCHEDULE UPDATE MEETINGS for the purpose of jointly reviewing the actual progress of the project as compared to the as planned progress and to review planned activities for the upcoming two weeks. Use the current approved schedule update for the purposes of this meeting and for the production and review of reports. At the weekly progress meeting, address the status of RFis, RFPs and Submittals.

3.8 REQUESTS FOR TIME EXTENSIONS

ASCE 67-17 provides delay analysis guidelines. If there is a conflict between the contract and guidance provided in ASCE 67-17, the contract will govern. Provide justification of delay to the Contracting Officer in accordance with the contract provisions and clauses for approval, within 10 days of a delay occuring. Also prepare a time impact analysis for each Government request for proposal (RFP).

3.8.1 Justification of Delay

Provide a description of the event(s) that caused the delay and/or impact to the work. As part of the description, identify all schedule activities impacted. Show that the event that caused the delay/impact was the responsibility of the Government. Provide a time impact analysis that demonstrates the effects of the delay or impact on the project completion date, or interim completion date(s). Evaluate multiple impacts chronologically; each with its own justification of delay. With multiple impacts consider any concurrency of delay. A time extension and the schedule fragnet becomes part of the project schedule and all future schedule updates upon approval by the Contracting Officer.

3.8.2 Changes That Do Not Cause Delay

If it is determined that a change does not constitute a schedule time extension, a fragnet as described in paragraph FRAGMENTARY NETWORK, is to be created and inserted into the Project schedule.

3.8.3 Time Impact Analysis (Prospective Analysis)

Submit requests for time extensions based on a prospective analysis if the work involved or the impact identified has not already occurred. Where the impact is ongoing a prospective analysis may be considered. However, the Government reserves the right to require a retrospective analysis be prepared after the impact has ended.

Prepare a time impact analysis for approval by the Contracting Officer based on industry recommended practice AACE 52R-06. Utilize a copy of the last approved schedule prior to the first day of the impact or delay for the time impact analysis. If Contracting Officer determines the time frame between the last approved schedule and the first day of impact is too great, prepare an interim updated schedule to perform the time impact analysis. Unless approved by the Contracting Officer, no other changes may be incorporated into the schedule being used to justify the time impact.

3.8.4 Forensic Schedule Analysis (Retrospective Analysis)

Submit requests for time extensions based on a retrospective analysis if the work involved or the impact identified has already occurred. The analysis must account for the actual performance of both the impacted work and all other contract work in the schedule.

If a methodology is chosen from AACE 29R-03, the method must adhere to the principles identified in ASCE 67-17. If there is a conflict with the methodology chosen from AACE 29R-03 and ASCE 67-17, ASCE 67-17 will govern. Choice of methodology should be discussed prior to submission to Government.

3.8.5 Fragmentary Network (Fragnet)

Prepare a proposed fragnet for time impact analysis consisting of a sequence of new activities that are proposed to be added to the project schedule to demonstrate the influence of the delay or impact to the project's contractual dates. Clearly show how the proposed fragnet is to be tied into the project schedule including all predecessors and successors to the fragnet activities. The proposed fragnet must be approved by the Contracting Officer prior to incorporation into the project schedule.

3.8.6 Time Extension

The Contracting Officer must approve the Justification of Delay including the time impact analysis before a time extension will be granted. No time extension will be granted unless the delay consumes all available Project Float and extends the projected finish date ("End Project" milestone) beyond the Contract Completion Date. The time extension will be in calendar days.

Actual delays that are found to be caused by the Contractor's own actions, which result in a calculated schedule delay, are not a cause for an extension to the performance period, completion date, or any interim milestone date.

3.8.7 Impact to Early Completion Schedule

No extended overhead will be paid for delay prior to the original Contract Completion Date for an Early Completion IPS unless the Contractor actually performed work in accordance with that Early Completion Schedule. The Contractor must show that an early completion was achievable had it not been for the impact.

3.9 FAILURE TO ACHIEVE PROGRESS

Should the progress fall behind the approved project schedule for reasons other than those that are excusable within the terms of the contract, the Contracting Officer may require provision of a written recovery plan for approval. The plan must detail how progress will be made-up to include which activities will be accelerated by adding additional crews, longer work hours, extra workdays, etc.

3.9.1 Artificially Improving Progress

Artificially improving progress by means such as, but not limited to, revising the schedule logic, modifying, or adding constraints, shortening activity durations, or changing calendars in the project schedule is prohibited. Indicate assumptions made and the basis for any logic, constraint, duration, and calendar changes used in the creation of the recovery plan. Any additional resources, manpower, or daily and weekly work hour changes proposed in the recovery plan must be evident at the work site and documented in the daily report along with the Schedule Narrative Report.

3.9.2 Failure to Perform

Failure to perform work and maintain progress in accordance with the supplemental recovery plan may result in an interim and final unsatisfactory performance rating and may result in corrective action directed by the Contracting Officer pursuant to RFO 52.236-15 Schedules for Construction Contracts,RFO 52.249-10 Default (Fixed-Price Construction), and other contract provisions.

3.9.3 Recovery Schedule

Should the Contracting Officer find it necessary, submit a recovery schedule pursuant to RFO 52.249-15 Schedules for Construction Contracts.

3.10 OWNERSHIP OF FLOAT

Except for the provision given in the paragraph IMPACT TO EARLY COMPLETION SCHEDULE, float available in the schedule, at any time, belongs to the Project and is available for Contractor and Government use. This includes activity and project float. Activity float is the number of workdays that an activity can be delayed without causing a delay to the "End Project" finish milestone. Project float (if applicable) is the number of work days between the projected early finish and the "End Project" finish.

3 .11 TRANSFER OF SCHEDULE DATA INTO RESIDENT MANAGEMENT SYSTEM

Ensure schedule data is uploaded to RMS. This data is additional supporting data in a form and detail required by the Contracting Officer pursuant to RFO 52.232-5 Payments under Fixed-Price Construction Contracts. The receipt of a proper payment request pursuant to RFO
52.232-27 Prompt Payment for Construction Contracts is contingent upon the progress schedule updates submitted with the progress payment.

3.12 PRIMAVERA P6 MANDATORY REQUIREMENTS

Ensure Primavera P6 settings provide a schedule capable of fulfilling the requirements of the contract. The following settings are mandatory and required in all schedule submissions to the Government:

a. Activity Codes must be Project Level, not Global or EPS level.

b. Calendars must be Project Level, not Global or Resource level.

c. Activity Duration Types must be set to "Fixed Duration & Units".

d. Percent Complete Types must be set to "Physical".

e. Time Period Admin Preferences must remain the default "8.0 hr/day, 40 hr/week, 172 hr/month, 2000 hr/year". Set Calendar Work Hours/Day to 8.0 Hour days.

f. Set Schedule Option for defining Critical Activities to "Longest Path".

g. Set Schedule Option for defining progressed activities to "Retained Logic".

h. Set up cost loading using a single lump sum non-labor resource. The

Price/Unit must be $1/hr, Default Units/Time must be "8h/d", and settings "Auto Compute Actuals" and "Calculate costs from units" un-selected.

i. Activity ID's must not exceed 10 characters.

j. Activity Names must have a verb-noun structure and contain the most defining and detailed description within the first 30 characters.

k. The daily ending hour for all work calendars must be the same.

-- End of Section --

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SECTION 01 33 00

SUBMITTAL PROCEDURES
08/18, CHG 4: 02/21

PART 1 GENERAL

1.1 SUMMARY

1.1.1 Submittal Information

The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections. Each submittal is to be complete and in sufficient detail to allow ready determination of compliance with contract requirements.

Units of weights and measures used on all submittals are to be the same as those used in the contract drawings.

1.1.2 Project Type

The Contractor and the Designer of Record (DOR), if applicable, are to check and approve all items before submittal and stamp, sign, and date indicating action taken. Proposed deviations from the contract requirements are to be clearly identified. Include within submittals items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals.

1.1.3 Submission of Submittals

Schedule and provide submittals requiring Government approval before acquiring the material or equipment covered thereby. Pick up and dispose of samples not incorporated into the work in accordance with manufacturer's Safety Data Sheets (SDS) and in compliance with existing laws and regulations.

1.2 DEFINITIONS

1.2.1 Submittal Descriptions (SD)

Submittal requirements are specified in the technical sections. Examples and descriptions of submittals identified by the Submittal Description (SD) numbers and titles follow:

SD-01 Preconstruction Submittals

Submittals that are required prior to or at the start of construction (work) or the next major phase of the construction on a multiphase contract.

Preconstruction Submittals include schedules and a tabular list of locations, features, and other pertinent information regarding products, materials, equipment, or components to be used in the work.

Certificates Of Insurance

Surety Bonds

List Of Proposed Subcontractors

List Of Proposed Products

Baseline Network Analysis Schedule (NAS)

Submittal Register

Schedule Of Prices Or Earned Value Report

Accident Prevention Plan

Work Plan

Quality Control (QC) plan

Environmental Protection Plan

SD-02 Shop Drawings

Drawings, diagrams and schedules specifically prepared to illustrate some portion of the work.

Diagrams and instructions from a manufacturer or fabricator for use in producing the product and as aids to the Contractor for integrating the product or system into the project.

Drawings prepared by or for the Contractor to show how multiple systems and interdisciplinary work will be coordinated.

SD-03 Product Data

Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions and brochures illustrating size, physical appearance and other characteristics of materials, systems or equipment for some portion of the work.

Samples of warranty language when the contract requires extended product warranties.

SD-04 Samples

Fabricated or unfabricated physical examples of materials, equipment or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged.

Color samples from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for the project.

Field samples and mock-ups constructed on the project site establish standards ensuring work can be judged. Includes assemblies or portions of assemblies that are to be incorporated into the project and those that will be removed at conclusion of the work.

SD-05 Design Data

Design calculations, mix designs, analyses or other data pertaining to a part of work.

Design submittals, design substantiation submittals and extensions of design submittals.

SD-06 Test Reports

Report signed by authorized official of testing laboratory that a material, product or system identical to the material, product or system to be provided has been tested in accord with specified requirements. Unless specified in another section, testing must have been within three years of date of contract award for the project.

Report that includes findings of a test required to be performed on an actual portion of the work or prototype prepared for the project before shipment to job site.

Report that includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.

Investigation reports

Daily logs and checklists

Final acceptance test and operational test procedure

SD-07 Certificates

Statements printed on the manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that the product, system, or material meets specification requirements. Must be dated after award of project contract and clearly name the project.

Document required of Contractor, or of a manufacturer, supplier, installer or Subcontractor through Contractor. The document purpose is to further promote the orderly progression of a portion of the work by documenting procedures, acceptability of methods, or personnel qualifications.

Confined space entry permits

Text of posted operating instructions

SD-08 Manufacturer's Instructions

Preprinted material describing installation of a product, system or material, including special notices and Safety Data Sheets(SDS)concerning impedances, hazards and safety precautions.

SD-10 Operation and Maintenance Data

Data provided by the manufacturer, or the system provider, including manufacturer's help and product line documentation, necessary to

maintain and install equipment, for operating and maintenance use by facility personnel.

Data required by operating and maintenance personnel for the safe and efficient operation, maintenance and repair of the item.

Data incorporated in an operations and maintenance manual or control system.

SD-11 Closeout Submittals

Documentation to record compliance with technical or administrative requirements or to establish an administrative mechanism.

Submittals required for Guiding Principle Validation (GPV) or Third Party Certification (TPC).

Special requirements necessary to properly close out a construction contract. For example, Record Drawings and as-built drawings. Also, submittal requirements necessary to properly close out a major phase of construction on a multi-phase contract.

1.2.2 Approving Authority

Office or designated person authorized to approve the submittal.

1.2.3 Work

As used in this section, on-site and off-site construction required by contract documents, including labor necessary to produce submittals, construction, materials, products, equipment, and systems incorporated or to be incorporated in such construction. In exception, excludes work to produce SD-01 submittals.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Submittal Register; G

1.4 SUBMITTAL CLASSIFICATION

1.4.1 Government Approved (G)

Government approval is required for any variations from the Solicitation or the Accepted Proposal and for other items as designated by the Government.

Within the terms of the Contract Clause SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION, submittals are considered to be "shop drawings."

1.4.2 Design-Build Submittal Classifications

1.4.2.1 Designer of Record Approved (DA)

Designer of Record (DOR) approval is required for extensions of design; critical materials; any variations from the Solicitation, the Accepted Proposal, or the completed design; equipment whose compatibility with the entire system must be checked; and other items as designated by the Contracting Officer. Provide the Government with the number of copies designated hereinafter of all DOR approved submittals. The Government may review any or all Designer of Record approved submittals for conformance with the Solicitation, the Accepted Proposal, and the completed design. The Government will review all submittals designated as varying from the Solicitation or Accepted Proposal, as described below. Provide design submittals in accordance with Section 01 33 16.00 10 DESIGN DATA (DESIGN AFTER AWARD). Generally, list design submittals under SD-05 Design Data.

1.4.2.2 Government Conformance Review of Design (CR)

The Government will review all intermediate and final design submittals for conformance with the technical requirements of the Solicitation. Section 01 33 16.00 10 DESIGN DATA (DESIGN AFTER AWARD) covers the design submittal and review process in detail. Review will be only for conformance with the applicable codes, standards, and contract requirements. Design data includes the design documents described in Section 01 33 16.00 10 DESIGN DATA (DESIGN AFTER AWARD).

1.4.2.3 Designer of Record Approved/Government Conformance Review (DA/CR)

1.4.2.3.1 Variations from the Accepted Design

DOR approval and the Government's concurrence are required for any proposed variation from the accepted design that still complies with the contract before the Contractor is authorized to proceed with material acquisition or installation. If necessary to facilitate the project schedule, before official submission to the Government, the Contractor and the DOR may discuss with the Contracting Officer's Representative a submittal proposing a variation. However, the Government reserves the right to review the submittal before providing an opinion. In any case, the Government will not formally agree to or provide a preliminary opinion on any variation without the DOR's approval or recommended approval. The Government reserves the right to reject any design, variation that may affect furniture, furnishings, equipment selections, or operational decisions that were made, based on the reviewed and concurred design.

1.4.2.3.2 Substitutions

Unless prohibited or otherwise provided for elsewhere in the contract, where the Accepted Proposal named products, systems, materials or equipment by manufacturer, brand name, model number, or other specific identification, and the Contractor desires to substitute a manufacturer or model after award, submit a requested substitution for Government concurrence. Include substantiation, through identifying information and the DOR's approval, that the substitute meets the contract requirements and that it is equal in function, performance, quality, and salient features to that in the accepted contract proposal. If the contract otherwise prohibits substitutions of equal named products, systems, materials or equipment by manufacturer, brand name, model number or other specific identification, the request is considered a ''variation" to the contract.

Variations are discussed below in paragraphs: "DESIGNER OF RECORD APPROVED/GOVERNMENT APPROVED" and VARIATIONS.

1.4.2.4 Designer of Record Approved/Government Approved (DA/GA)

In addition to the above-stated requirements for proposed variations to the accepted design, both DOR and Government Approval and, where applicable, a contract modification are required before the Contractor is authorized to proceed with material acquisition or installation for any proposed variation to the contract (the Solicitation or the Accepted Proposal), that constitutes a change to the contract terms. The Government reserves the right to accept or reject any such proposed variation.

1.4.3 For Information Only

Submittals not requiring Government approval will be for information only. For Design-build construction all submittals not requiring DOR or Government approval will be for information only. Within the terms of the Contract Clause SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION, they are not considered to be "shop drawings."

1.4.4 Sustainability Reporting Submittals (S)

Submittals for Guiding Principle Validation (GPV) or Third Party Certification (TPC) are indicated with an "S" designation. These submittals are for information only and for use as specified in Section 01 33 29 SUSTAINABILITY REQUIREMENTS AND REPORTING.

Schedule submittals for these items throughout the course of construction as provided; do not wait until closeout.

1.5 PREPARATION

1.5.1 Transmittal Form

Use the ENG Form 4025-R transmittal form for submitting both Government-approved and information-only submittals. Submit in accordance with the instructions on the reverse side of the form. These forms or similar forms are included in the RMS CM software that the Contractor is required to use for this contract. Properly complete this form by filling out all the heading blank spaces and identifying each item submitted. Exercise special care to ensure proper listing of the specification paragraph and sheet number of the contract drawings pertinent to the data submitted for each item.

1.5.2 Submittal Format

1.5.2.1 Format of SD-01 Preconstruction Submittals

When the submittal includes a document that is to be used in the project, or is to become part of the project record, other than as a submittal, do not apply the Contractor's approval stamp to the document itself, but to a separate sheet accompanying the document.

Provide data in the unit of measure used in the contract documents.

1.5.2.2 Format for SD-02 Shop Drawings

Provide shop drawings not less than 8 1/2 by 11 inches nor more than 30 by

42 inches, except for full-size patterns or templates. Prepare drawings to accurate size, with scale indicated, unless another form is required. Ensure drawings are suitable for reproduction and of a quality to produce clear, distinct lines and letters, with dark lines on a white background.

a. Include the nameplate data, size, and capacity on drawings. Also include applicable federal, military, industry, and technical society publication references.

b. Dimension drawings, except diagrams and schematic drawings. Prepare drawings demonstrating interface with other trades to scale. Use the same unit of measure for shop drawings as indicated on the contract drawings. Identify materials and products for work shown.

Present shop drawings sized 8 1/2 by 11 inches as part of the bound volume for submittals. Present larger drawings in sets. Submit an electronic copy of drawings in PDF format and native electronic format.

1.5.2.2.1 Drawing Identification

Include on each drawing the drawing title, number, date, and revision numbers and dates, in addition to information required in paragraph IDENTIFYING SUBMITTALS.

Number drawings in a logical sequence. Each drawing is to bear the number of the submittal in a uniform location next to the title block. Place the Government contract number in the margin, immediately below the title block, for each drawing.

Reserve a blank space, no smaller than 2 inches on the right-hand side of each sheet for the Government disposition stamp.

1.5.2.3 Format of SD-03 Product Data

Present product data submittals for each section as a complete, bound volume. Include a table of contents, listing the page and catalog item numbers for product data.

Indicate, by prominent notation, each product that is being submitted; indicate the specification section number and paragraph number to which it pertains.

1.5.2.3.1 Product Information

Supplement product data with material prepared for the project to satisfy the submittal requirements where product data does not exist. Identify this material as developed specifically for the project, with information and format as required for submission of SD-07 Certificates.

Provide product data in units used in the Contract documents. Where product data are included in preprinted catalogs with another unit, submit the dimensions in contract document units, on a separate sheet.

1.5.2.3.2 Standards

Where equipment or materials are specified to conform to industry or technical-society reference standards of such organizations as the American National Standards Institute (ANSI), ASTM International (ASTM), National Electrical Manufacturer's Association (NEMA), Underwriters Laboratories

(UL), or Association of Edison Illuminating Companies (AEIC), submit proof of such compliance. The label or listing by the specified organization will be acceptable evidence of compliance. In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing, and approved by the Contracting Officer. State on the certificate that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard.

1.5.2.3.3 Data Submission

Collect required data submittals for each specific material, product, unit of work, or system into a single submittal that is marked for choices, options, and portions applicable to the submittal. Mark each copy of the product data identically. Partial submittals will not be accepted for expedition of the construction effort.

Submit the manufacturer's instructions before installation.

1.5.2.4 Format of SD-04 Samples

1.5.2.4.1 Sample Characteristics

Furnish samples in the following sizes, unless otherwise specified or unless the manufacturer has prepackaged samples of approximately the same size as specified:

a. Sample of Equipment or Device: Full size.

b. Sample of Materials Less Than 2 by 3 inches: Built up to 8 1/2 by 11 inches.

c. Sample of Materials Exceeding 8 1/2 by 11 inches: Cut down to 8 1/2 by 11 inches and adequate to indicate color, texture, and material variations.

d. Sample of Linear Devices or Materials: 10 inch length or length to be supplied, if less than 10 inches. Examples of linear devices or materials are conduit and handrails.

e. Sample Volume of Nonsolid Materials: Pint. Examples of nonsolid materials are sand and paint.

f. Color Selection Samples: 2 by 4 inches. Where samples are specified for selection of color, finish, pattern, or texture, submit the full set of available choices for the material or product specified. Sizes and quantities of samples are to represent their respective standard unit.

g. Sample Panel: 4 by 4 feet.

h. Sample Installation: 100 square feet.

1.5.2.4.2 Sample Incorporation

Reusable Samples: Incorporate returned samples into work only if so specified or indicated. Incorporated samples are to be in undamaged condition at the time of use.

Recording of Sample Installation: Note and preserve the notation of any area constituting a sample installation, but remove the notation at the final clean-up of the project.

1.5.2.4.3 Comparison Sample

Samples Showing Range of Variation: Where variations in color, finish, pattern, or texture are unavoidable due to nature of the materials, submit sets of samples of not less than three units showing extremes and middle of range. Mark each unit to describe its relation to the range of the variation.

When color, texture, or pattern is specified by naming a particular manufacturer and style, include one sample of that manufacturer and style, for comparison.

1.5.2.5 Format of SD-05 Design Data

Provide design data and certificates on 8 1/2 by 11 inch paper. Provide a bound volume for submittals containing numerous pages.

1.5.2.6 Format of SD-06 Test Reports

Provide reports on 8 1/2 by 11 inch paper in a complete bound volume.

By prominent notation, indicate each report in the submittal. Indicate the specification number and paragraph number to which each report pertains.

1.5.2.7 Format of SD-07 Certificates

Provide design data and certificates on 8 1/2 by 11 inch paper. Provide a bound volume for submittals containing numerous pages.

1.5.2.8 Format of SD-08 Manufacturer's Instructions

Present manufacturer's instructions submittals for each section as a complete, bound volume. Include the manufacturer's name, trade name, place of manufacture, and catalog model or number on product data. Also include applicable federal, military, industry, and technical-society publication references. If supplemental information is needed to clarify the manufacturer's data, submit it as specified for SD-07 Certificates.

Submit the manufacturer's instructions before installation.

1.5.2.8.1 Standards

Where equipment or materials are specified to conform to industry or technical-society reference standards of such organizations as the American National Standards Institute (ANSI), ASTM International (ASTM), National Electrical Manufacturer's Association (NEMA), Underwriters Laboratories (UL), or Association of Edison Illuminating Companies (AEIC), submit proof of such compliance. The label or listing by the specified organization **will** be acceptable evidence of compliance. In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing, and approved by the Contracting Officer. State on the certificate that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard.

1.5.2.9 Format of SD-09 Manufacturer's Field Reports

Provide reports in electronic format.

By prominent notation, indicate each report in the submittal. Indicate the specification number and paragraph number to which each report pertains.

1.5.2.10 Format of SD-10 Operation and Maintenance Data (O&M)

Comply with the requirements specified in Section 01 78 23 OPERATION AND MAINTENANCE DATA for O&M Data format.

1.5.2.11 Format of SD-11 Closeout Submittals

When the submittal includes a document that is to be used in the project or is to become part of the project record, other than as a submittal, do not apply the Contractor's approval stamp to the document itself, but to a separate sheet accompanying the document.

Provide data in the unit of measure used in the contract documents.

1.5.3 Source Drawings for Shop Drawings

1.5.3.1 Source Drawings

If available, the Government may provide the source drawings to the Contractor to be used in the preparation of record drawings. The source drawings will be for informational purposes only. The Contractor shall verify the current conditions and not rely solely on the source documents provided by the Government as actual conditions may differ from the source drawings.

1.5.3.2 Terms and Conditions

Data contained on these electronic files must not be used for any purpose other than as a convenience in the preparation of construction data for the referenced project. Any other use or reuse is at the sole risk of the Contractor and without liability or legal exposure to the Government. The Contractor must make no claim, and waives to the fullest extent permitted by law any claim or cause of action of any nature against the Government, its agents, or its subconsultants that may arise out of or in connection with the use of these electronic files. The Contractor must, to the fullest extent permitted by law, indemnify and hold the Government harmless against all damages, liabilities, or costs, including reasonable attorney's fees and defense costs, arising out of or resulting from the use of these electronic files.

These electronic source drawing files are not construction documents. Differences may exist between the source drawing files and the corresponding construction documents. The Government makes no representation regarding the accuracy or completeness of the electronic source drawing files, nor does it make representation to the compatibility of these files with the Contractor hardware or software. The Contractor is responsible for determining if any conflict exists. In the event that a conflict arises between the signed and sealed construction documents prepared by the Government and the furnished source drawing files, the signed and sealed construction documents govern. Use of these source drawing files does not relieve the Contractor of the duty to fully comply with the contract documents, including and without limitation the need to

check, confirm and coordinate the work of all contractors for the project. If the Contractor uses, duplicates or modifies these electronic source drawing files for use in producing construction data related to this contract, remove all previous indication of ownership (seals, logos, signatures, initials and dates)

1.5.4 Electronic File Format

Provide submittals in electronic format, with the exception of material samples required for SD-04 Samples items. Compile the submittal file as a single, complete document, to include the Transmittal Form described within, and also separately attach the native files which were used to create PDF. The attached files should include the original digital files used to create the submittal. Name the electronic submittal file specifically according to its contents, and coordinate the file naming convention with the Contracting Officer. Electronic files must be of sufficient quality that all information is legible. Use PDF as the electronic format, unless otherwise specified or directed by the Contracting Officer. Generate PDF files from original documents with bookmarks so that the text included in the PDF file is searchable and can be copied. If documents are scanned, optical character resolution (OCR) routines are required. Index and bookmark files exceeding 30 pages to allow efficient navigation of the file. When required, the electronic file must include a valid electronic signature or a scan of a signature.

E-mail electronic submittal documents smaller than 10MB to an e-mail address as directed by the Contracting Officer. Provide electronic Documents, design submittals only, over 10 MB on an optical disc or through an electronic file sharing system such as the DOD SAFE Web Application located at the following website: https://safe.apps.mil/.

1.6 QUANTITY OF SUBMITTALS

1.6.1 Number of SD-01 Preconstruction Submittal Copies

Unless otherwise specified, submit administrative submittals in electronic format.

1.6.2 Number of SD-02 Shop Drawing Copies

Submit all shop drawings in electronic format.

1.6.3 Number of SD-03 Product Data Copies

Submit in compliance with quantity requirements specified for shop drawings.

1.6.4 Number of SD-04 Samples

a. Submit two samples, or two sets of samples showing the range of variation, of each required item. One approved sample or set of samples will be retained by the approving authority and one will be returned to the Contractor.

b. Submit one sample panel or provide one sample installation where directed. Include components listed in the technical section or as directed.

c. Submit one sample installation, where directed.

d. Submit one sample of nonsolid materials.

1.6.5 Number of SD-05 Design Data Copies

Submit in compliance with quantity requirements specified for shop drawings.

1.6.6 Number of SD-06 Test Report Copies

Submit in compliance with quantity and quality requirements specified for shop drawings, other than field test results that will be submitted with QC reports.

1.6.7 Number of SD-07 Certificate Copies

Submit in compliance with quantity requirements specified for shop drawings.

1.6.8 Number of SD-08 Manufacturer's Instructions Copies

Submit in compliance with quantity requirements specified for shop drawings.

1.6.9 Number of SD-09 Manufacturer's Field Report Copies

Submit in compliance with quantity and quality requirements specified for shop drawings other than field test results that will be submitted with QC reports.

1.6.10 Number of SD-10 Operation and Maintenance Data Copies

Submit five copies of O&M data to the Contracting Officer for review and approval.

1.6.11 Number of SD-11 Closeout Submittals Copies

Unless otherwise specified, submit three sets of closeout submittals.

1.7 INFORMATION ONLY SUBMITTALS

Submittals without a "G" designation must be certified by the QC manager and submitted to the Contracting Officer for information-only. Provide information-only submittals to the Contracting Officer a minimum of 14 calendar days prior to the Preparatory Meeting for the associated Definable Feature of Work (DFOW). Approval of the Contracting Officer is not required on information only submittals. The Contracting Officer will mark "receipt acknowledged" on submittals for information and will return only the transmittal cover sheet to the Contractor. Normally, submittals for information only will not be returned. However, the Government reserves the right to return unsatisfactory submittals and require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe. For Design-Build construction, the Government will retain two copies of information-only submittals.

1.8 PROJECT SUBMITTAL REGISTER

A sample Project Submittal Register showing items of equipment and materials for when submittals are required by the specifications is provided as "Attachment A - Submittal Register."

1.8.1 Submittal Management

Prepare and maintain a submittal register, as the work progresses. Do not change data that is output in columns (c), (d), (e), and (f) as delivered by Government; retain data that is output in columns (a), (g), (h), and (i) as approved. As an attachment, provide a submittal register showing items of equipment and materials for which submittals are required by the specifications. This list may not be all-inclusive and additional submittals may be required. Maintain a submittal register for the project in accordance with Section 01 45 00.15 10 RESIDENT MANAGEMENT SYSTEM CONTRACTOR MODE(RMS CM). The Government will provide the initial submittal register in electronic format with the following fields completed, to the extent that will be required by the Government during subsequent usage.

Column (c) Lists specification section in which submittal is required.

Column (d) Lists each submittal description (SD Number. and type, e.g., SD-02 Shop Drawings) required in each specification section.

Column (e) Lists one principal paragraph in each specification section where a material or product is specified. This listing is only to facilitate locating submitted requirements. Do not consider entries in column (e) as limiting the project requirements.

Thereafter, the Contractor is to track all submittals by maintaining a complete list, including completion of all data columns and all dates on which submittals are received by and returned by the Government.

1.8.2 Design-Build Submittal Register

The Designer of Record develops a complete list of submittals during design and identify required submittals in the specifications, and use the list to prepare the Submittal Register. The list may not be all inclusive and additional submittals may be required by other parts of the contract. Complete the submittal register and submit it to the Contracting Officer for approval within 30 calendar days after Notice to Proceed. The approved submittal register will serve as a scheduling document for submittals and will be used to control submittal actions throughout the contract period. Coordinate the submit dates and need dates with dates in the Contractor prepared progress schedule. Submit monthly or until all submittals have been satisfactorily completed, updates to the submittal register showing the Contractor action codes and actual dates with Government action codes. Revise the submittal register when the progress schedule is revised and submit both for approval.

1.8.3 Preconstruction Use of Submittal Register

Submit the submittal register. Include the QC plan and the project schedule. Verify that all submittals required for the project are listed and add missing submittals. Coordinate and complete the following fields

on the register submitted with the QC plan and the project schedule:

Column (a) Activity Number: Activity number from the project schedule.

Column (g) Contractor Submit Date: Scheduled date for the approving authority to receive submittals.

Column (h) Contractor Approval Date: Date that Contractor needs approval of submittal.

Column (i) Contractor Material: Date that Contractor needs material delivered to Contractor control.

1.8.4 Contractor Use of Submittal Register

Update the following fields in the Government-furnished submittal register program or equivalent fields in the program used by the Contractor with each submittal throughout the contract.

Column (b) Transmittal Number: List of consecutive, Contractor-assigned numbers.

Column (j) Action Code (k): Date of action used to record Contractor's review when forwarding submittals to QC.

Column (1) Date submittal transmitted.

Column (q) Date approval was received.

1.8.5 Approving Authority Use of Submittal Register

Update the following fields:

Column (b) Transmittal Number: List of consecutive, Contractor-assigned numbers.

Column (1) Date submittal was received.

Column (m) through (p) Dates of review actions.

Column (q) Date of return to Contractor.

1.8.6 Action Codes

1.8.6.1 Contractor Action Codes

DESIGN BUILD SUBMITTALS			
Submittal Classifications shown in UFGS Sections	Submittal Classification	Corresponding SpecsIntact Submittal Register Code which is populated in the SI Submittal Register. Software Limitations: (The software shows one character delineation in the Specsintact Submittal Register)	RMS - The following Submittal Classifications are populated in RMS when the SpecsIntact Submittal Data File is pulled into RMS)
G	Submittal requires	G	GA
BLANK	Submittal is For Information	BLANK	FIO
DA	Submittal requires	D	DA
CR	Submittal requires Government	C	CR
DA/CR	Submittal requires Designer of Record Approval and Government Conformance	R	DA/CR
DA/GA	Submittal requires Designer of Record Approval and	A	DA/GA

1.8.7 Delivery of Copies

Submit an updated electronic copy of the submittal register to the Contracting Officer with each invoice request. Provide an updated Submittal Register monthly regardless of whether an invoice is submitted.

1.9 VARIATIONS

Variations from contract requirements require Contracting Officer approval pursuant to RFO 52.236-21 Specifications and Drawings for Construction, and will be considered where advantageous to the Government.

1.9.1 Considering Variations

Discussion of variations with the Contracting Officer before submission of a variation submittal will help ensure that functional and quality requirements are met and minimize rejections and resubmittals. For variations that include design changes or some material or product substitutions, the Government may require an evaluation and analysis by a licensed professional engineer hired by the contractor.

Specifically point out variations from contract requirements in a transmittal letter. Failure to point out variations may cause the Government to require rejection and removal of such work at no additional cost to the Government.

1.9.2 Proposing Variations

When proposing variation, deliver a submittal, clearly marked as a "VARIATION" to the Contracting Officer, with documentation illustrating the nature and features of the variation including any necessary technical submittals and why the variation is desirable and beneficial to Government. If lower cost is a benefit, also include an estimate of the cost savings. In addition to documentation required for variation, include the submittals required for the item. Clearly mark the proposed variation in all documentation.

Check the column "variation" of ENG Form 4025 for submittals that include variations proposed by the Contractor. Set forth in writing the reason for any variations and note such variations on the submittal. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted variations.

1.9.3 Warranting that Variations are Compatible

When delivering a variation for approval, the Contractor warrants that this contract has been reviewed to establish that the variation, if incorporated, will be compatible with other elements of work.

1.9.4 Review Schedule Extension

In addition to the normal submittal review period, a period of 10 calendar days will be allowed for the Government to consider submittals with variations.

1.10 SCHEDULING

Schedule and submit concurrently product data and shop drawings covering component items forming a system or items that are interrelated. Submit pertinent certifications at the same time. No delay damages or time extensions will be allowed for time lost in late submittals. Allow an additional 14 calendar days for review and approval of submittals for refrigeration and HVAC control systems.

a. Coordinate scheduling, sequencing, preparing, and processing of submittals with performance of work so that work will not be delayed by submittal processing. The Contractor is responsible for additional time required for Government reviews resulting from required resubmittals. The review period for each resubmittal is the same as for the initial submittal.

b. Submittals required by the contract documents are listed on the

submittal register. If a submittal is listed in the submittal register but does not pertain to the contract work, the Contractor is to include the submittal in the register and annotate it "N/A" with a brief explanation. Approval by the Contracting Officer does not relieve the Contractor of supplying submittals required by the contract documents but that have been omitted from the register or marked "N/A."

c. Resubmit the submittal register and annotate it monthly with actual submission and approval dates. When all items on the register have been fully approved, no further resubmittal is required.

Contracting Officer review will be completed within 30 calendar days after the date of submission.

1.10.1 Government Reviewed Design

The Government will review design submittals for conformance with the technical requirements of the Solicitation. Section 01 33 16.00 10 DESIGN DATA (DESIGN AFTER AWARD) covers the design submittal and review process in detail. Government review is required for variations from the completed design. Review will be only for conformance with the contract requirements. Included are only those construction submittals for which the DOR's design documents do not include enough detail to ascertain contract compliance. The Government may, but is not required to, review extensions of design, including but not limited to structural steel or reinforcement shop drawings.

1.11 GOVERNMENT APPROVING AUTHORITY

When the approving authority is the Contracting Officer, the Government will:

a. Note the date on which the submittal was received.

b. Review submittals for approval within the scheduling period specified and only for conformance with project design concepts and compliance with contract documents.

c. Identify returned submittals with one of the actions defined in paragraph REVIEW NOTATIONS and with comments and markings appropriate for the action indicated.

Upon completion of review of submittals requiring Government approval, stamp and date submittals. If the Government performs a conformance review of other Designer of Record approved submittals, the submittals will be identified and returned, as described above.

1.11.1 Review Notations

Submittals will be returned to the Contractor with the following notations:

a. Submittals marked "approved'' or "accepted" authorize proceeding with the work covered.

b. Submittals marked "approved as noted" or "approved, except as noted, resubmittal not required," authorize proceeding with the work covered provided that the Contractor takes no exception to the corrections.

c. Submittals marked "not approved," "disapproved," or "revise and resubmit" indicate incomplete submittal or noncompliance with the contract requirements or design concept. Resubmit with appropriate changes. Do not proceed with work for this item until the resubmittal is approved.

d. Submittals marked "not reviewed'' indicate that the submittal has been previously reviewed and approved, is not required, does not have evidence of being reviewed and approved by Contractor, or is not complete. A submittal marked "not reviewed" will be returned with an explanation of the reason it is not reviewed. Resubmit submittals returned for lack of review by Contractor or for being incomplete, with appropriate action, coordination, or change.

e. Submittals marked "receipt acknowledged" indicate that submittals have been received by the Government. This applies only to "information-only submittals" as previously defined.

1.12 DISAPPROVED SUBMITTALS

Make corrections required by the Contracting Officer. If the Contractor considers any correction or notation on the returned submittals to constitute a change to the contract drawings or specifications, give notice to the Contracting Officer as required under the RFO clause titled CHANGES. The Contractor is responsible for the dimensions and design of connection details and the construction of work. Failure to point out variations may cause the Government to require rejection and removal of such work at the Contractor's expense.

If changes are necessary to submittals, make such revisions and resubmit in accordance with the procedures above. No item of work requiring a submittal change is to be accomplished until the changed submittals are approved.

1.13 APPROVED SUBMITTALS

The Contracting Officer's approval of submittals is not to be construed as a complete check, and indicates only that the general method of construction, materials, detailing, and other information are satisfactory. the design, general method of construction, materials, detailing, and other information appear to meet the Solicitation and Accepted Proposal.

Approval or acceptance by the Government for a submittal does not relieve the Contractor of the responsibility for meeting the contract requirements or for any error that may exist, because under the Quality Control (QC) requirements of this contract, the Contractor is responsible for ensuring information contained with in each submittal accurately conforms with the requirements of the contract documents.

After submittals have been approved or accepted by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

1.14 APPROVED SAMPLES

Approval of a sample is only for the characteristics or use named in such approval and is not be construed to change or modify any contract requirements. Before submitting samples, provide assurance that the

materials or equipment will be available in quantities required in the project. No change or substitution will be permitted after a sample has been approved.

Match the approved samples for materials and equipment incorporated in the work. If requested, approved samples, including those that may be damaged in testing, will be returned to the Contractor, at its expense, upon completion of the contract. Unapproved samples will also be returned to the Contractor at its expense, if so requested.

Failure of any materials to pass the specified tests will be sufficient cause for refusal to consider, under this contract, any further samples of the same brand or make as that material. The Government reserves the right to disapprove any material or equipment that has previously proved unsatisfactory in service.

Samples of various materials or equipment delivered on the site or in place may be taken by the Contracting Officer for testing. Samples failing to meet contract requirements will automatically void previous approvals. Replace such materials or equipment to meet contract requirements.

1.15 WITHHOLDING OF PAYMENT

No payment for materials incorporated in the work will be made unless all required DOR approvals or required Government approvals have been obtained. No payment will be made for any materials incorporated into the work for any conformance review submittals or information-only submittals found to contain errors or deviations from the Solicitation or Accepted Proposal.

1.16 CERTIFICATION OF SUBMITTAL DATA

Certify the submittal data as follows on Form ENG 4025: "I certify that the above submitted items had been reviewed in detail and are correct and in strict conformance with the contract drawings and specifications except as otherwise stated.

_____NAME OF CONTRACTOR _____SIGNATURE OF CONTRACTOR

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

End of Section --

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SECTION 01 33 16.00 10
DESIGN DATA (DESIGN AFTER AWARD)

1.0 GENERAL INFORMATION 3
1.1 INTRODUCTION 3
1.2 DESIGNER OF RECORD 3
2.0 PRODUCTS (Not Applicable) 4
3.0 EXECUTION 4
3.1 PRE-WORK ACTIVITIES & CONFERENCES 4
3.1.1 Design Quality Control Plan 4
3.1.2 Post Award Conference 4
3.1.3 Initial Design Conference 5
3.1.4 Preconstruction Conference 5
3.2 STAGES OF DESIGN SUBMITTALS AND OVER THE SHOULDER PROGRESS REVIEWS .. 5
3.2.1 Site/Utilities 5
3.2.2 Interim Design Submittals 6
3.2.3 Over-the-Shoulder Progress Review 6
3.2.4 Final Design Submission 7
3.2.5 Design Complete Submittals 7
3.2.6 Holiday Periods for Government Review or Actions 7
3.2.7 Late Submittals and Reviews 7
3.3 DESIGN CONFIGURATION MANAGEMENT 7
3.3.1 Procedure 7
3.3.2 Tracking Design Review Comments 8
3.3.3 Design and Code Checklist 8
3.4 INTERIM DESIGN REVIEWS AND CONFERENCES 8
3.4.1 General 8
3.4.2 Procedure 8
3.4.3 Conference Documentation 9
3.5 INTERIM DESIGN REQUIREMENTS 9
3.5.1 Drawings 9
3.5.2 Design Analyses 9
3.5.3 Geotechnical Investigations and Reports 12
3.5.4 LEED Documentation: N/A 13
3.5.5 Energy & Sustainability Record Card 13
3.5.6 Energy Conservation 13

3.5.7 Specifications 14
3.5.8 Interim Building Design Contents 15
3.5.9 Civil Site and Utilities Design Contents 19
3.6 FINAL DESIGN REVIEWS AND CONFERENCES 19
3.7 FINAL DESIGN REQUIREMENTS 19
3.7.1 Drawings 20
3.7.2 Design Analysis 21
3.7.3 Specifications 21
3.7.4 Submittal Register 22
3.7.5 Preparation of DD Form 1354 (Transfer of Real Property) 22
3.7.6 Acceptance and Release for Construction 22
3.8 DESIGN COMPLETE CONSTRUCTION DOCUMENT REQUIREMENTS 22
3.9 SUBMITTAL DISTRIBUTION, MEDIA AND QUANTITIES 23
3.9.1 Submittal Distribution and Quantities 23
3.9.2 Web based Design Submittals 25
3.10 AS-BUILT DOCUMENTS 25

-- End of Section Table of Contents -

SECTION 01 33 16.00 10
DESIGN DATA (DESIGN AFTER AWARD)

1.0 GENERAL INFORMATION

1.1 INTRODUCTION

The information contained in this section applies to the design required after award. After award, the Contractor will develop the accepted proposal into the completed design, as described herein.

The Contractor may elect to fast track the design and construction that is, proceed with construction of parts of the sitework and utilities prior to completion of the overall design. Fast track packages shall be limited to demolition, clearing and grubbing, site work, and related civil scope items. All fast track options shall be coordinated with and confirmed by USACE SWL, and Pine Bluff Arsenal. Refer to paragraph 3.2.1 Site/Utilities. Designate how it will package the design, consistent with its overall plan for permitting (where applicable) and construction of the project. See Sections 01 33 00 SUBMITTAL PROCEDURES and 01 32 01.00 10 PROJECT SCHEDULE for requirements for identifying and scheduling the design packaging plan in the submittal register and project schedule. See also Sections 01 11 00 STATEMENT OF WORK, 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS for any specified permit requirements. If early procurement of long-lead item construction materials or installed equipment, prior to completion of the associated design package, is necessary to facilitate the project schedule, also identify those long-lead items and how it will assure design integrity of the associated design package to meet the contract requirements (The Contract consists of the Solicitation requirements and the accepted proposal). Once the Government is satisfied that the long-lead items meet the contract requirements, the Contracting Officer will allow the Contractor to procure the items at its own risk.

The Contractor may proceed with the construction work included in a design package after the Government has reviewed the final (100%) design submission for that package, review comments have been addressed and resolved to the Government's satisfaction and the Contracting Officer (or the Administrative Contracting Officer) has agreed that the design package may be released for construction.

INTEGRATED DESIGN. To the maximum extent permitted for this project, use a collaborative, integrated design process for all stages of project delivery with comprehensive performance goals for siting, energy, water, materials and indoor environmental quality and ensures incorporation of these goals. Consider all stages of the building lifecycle, including deconstruction.

1.2 DESIGNER OF RECORD

Identify, for approval, the Designer of Record ("DOR") that will be responsible for each area of design. One DOR may be responsible for more than one area. Designers holding current state issued Professional registration, DOR(s)shall account for all design disciplines.

sign, and date each design drawing and other design deliverables under their responsible discipline at each design submittal stage (see contract clause Registration of Designers). If the deliverables are not ready for release for construction, identify them as "preliminary" or "not for release for construction" or by using some other appropriate designation. The DOR(s) shall also be responsible for maintaining the integrity of the design and for compliance with the contract requirements through construction and documentation of the as-built condition by coordination, review and approval of extensions of design, material, equipment and other construction submittals, review and approval or disapproval of requested deviations to the accepted design or to the contract, coordination with the Government of the above activities, and by performing other typical professional designer responsibilities.

2.0 PRODUCTS (NOT APPLICABLE)

3.0 EXECUTION

3.1 PRE-WORK ACTIVITIES & CONFERENCES

3.1.1 Design Quality Control Plan

Submit for Government acceptance, a Design Quality Control Plan in accordance with Section 01 45 00 CONTRACTOR QUALITY CONTROL before design may proceed.

3.1.2 Post Award Conference

3.1.2.1 The government will conduct a post award contract administration conference at the project site, as soon as possible after contract award. This will be coordinated with issuance of the contract notice to proceed (NTP). The Contractor and major sub-contractor representatives shall participate. Not all designers are required at the first meeting. Government representatives will include COE project delivery team members, facility users, facility command representatives, and installation representatives. The Government will provide an agenda, meeting goals, meeting place, and meeting time to participants prior to the meeting.

3.1.2.2 The post award conference shall include determination and introduction of contact persons, their authorities, contract administration requirements, discussion of expected project progress processes, and coordination of subsequent meetings for quality control (see Section 01 45 00.00 10 CONTRACTOR QUALITY CONTROL), and the initial design conference (see below).

3.1.2.3 The government will introduce USACE project delivery team members, facility users, facility command representatives, and installation representatives. The DB Contractor shall introduce major subcontractors, and other needed staff. Expectations and duties of each person shall be defined for all participants. A meeting roster shall be developed and distributed by the government with complete contact information including name, office, project role, phone,

mailing and physical address, and email address.

3.1.3 Initial Design Conference

The initial design conference may be scheduled and conducted at the project installation any time after the post award conference. Any design work conducted after award and prior to this conference should be limited to site and is discouraged for other items. All Designers of Record shall participate in the conference. The purpose of the meeting is to introduce everyone and to make sure any needs the contractor has are assigned and due dates established as well as who will get the information. The Government and Contractor shall develop, establish, and agree to comprehensive design development processes including conduct of conferences, expectations of design development at conferences, fast-tracking, design acceptance, Structural Interior Design (SID)/ Furniture, Fixtures & Equipment (FF&E) design requirements, project closeout, etc. The government will explain contract requirements and the DB Contractor shall review their proposed project schedule and suggest ways to streamline processes. The DB Contractor shall conduct the initial design conference and will provided minutes of this meeting to all participants.

3.1.4 Preconstruction Conference

Before starting construction activities, the Contractor and Government will jointly conduct a pre- construction administrative conference to discuss any outstanding requirements and to review local installation requirements for start of construction. It is possible there will be multiple Pre-Construction Conferences based on the content of the design packages selected by the Contractor. The Government will provide minutes of this meeting to all participants

3.2 STAGES OF DESIGN SUBMITTALS AND OVER THE SHOULDER PROGRESS REVIEWS

The stages of design submittals described below define Government expectations with respect to process and content. The Contractor shall determine how to best plan and execute the design and review process for this project, within the parameters listed below. As a minimum, the Government expects to see at least one interim design submittal, at least one final design submittal before construction of a design package may proceed and at least one Design Complete submittal that documents the accepted design.

3.2.1 Site/Utilities

To facilitate fast-track design-construction activities the contractor may submit a final (100%) site and utility design as the first design submittal, or it may elect to submit interim and final site and utility design submittals as explained below. Following review, resolution, and incorporation of all Government comments, and submittal of a satisfactory set of site/utility design documents, after completing all other pre-construction requirements in this contract and after the pre-construction meeting, the Government will allow the Contractor to proceed with site development activities, including demolition where applicable, within the parameters set forth in the accepted design submittal. For the first site and utility design submission, whether an interim or final, the submittal review, comment, and

resolution times from this specification apply, except that the Contractor shall allow the Government a 21 calendar day review period, exclusive of mailing time. No on-site construction activities shall begin prior to written Government clearance to proceed.

3.2.2 Interim Design Submittals

The Contractor shall submit a single interim design for review, representing a complete package with all design disciplines. As required in Section 01 32 01.00 10 PROJECT SCHEDULE, the Contractor shall schedule its design and construction packaging plan to meet the contract completion period. This submission is the Government's primary opportunity to review the design for conformance to the solicitation and to the accepted contract proposal and to the Building Codes at a point where required revisions may still be made, while minimizing lost design effort to keep the design on track with the contract requirements. The requirements for the interim design review submittal and review conference are described hereinafter. This is not necessarily a hold point for the design process; the Contractor may designate the interim design submittals a snapshot and proceed with design development at its own risk. See below for a waiver, where the parties establish an effective over-the-shoulder progress review procedure that would eliminate the need for or expedite a formal intermediate design review.

3.2.3 Over-the-Shoulder Progress Review

To facilitate a streamlined design-build process, the Government and the Contractor may agree to one- on-one reviewer or small group reviews, electronically, on-line (if available within the Contractor's standard design practices) or at the Contractor's design offices or other agreed location, when practicable to the parties. The Government and Contractor will coordinate such reviews to minimize or eliminate disruptions to the design process. Any data required for these reviews shall normally be provided in electronic format, rather than in hard copy. If the Government and Contractor establish and implement an effective, mutually agreeable procedure for regular (e.g., weekly) over-the shoulder review procedures that allow the Government reviewers the opportunity to keep fully informed of the progress, contents, design intent, design documentation, etc. of the design, the Government will agree to waive or to expedite the formal intermediate design review period for the design. The Contractor shall still be required to submit the required intermediate design documentation, however the parties may agree to how that material will be provided, in lieu of a formal consolidated submission. It should be noted that Government funding is extremely limited for non-local travel by design reviewers, so the maximum use of virtual teaming methods must be used. Some possible examples include electronic file sharing, interactive software with on-line or telephonic conferencing, televideo conferencing, etc. The Government must still perform its Code and Contract conformance reviews, so the Contractor is encouraged to partner with the reviewers to find ways to facilitate this process and to facilitate meeting or bettering the design-build schedule. The Contractor shall maintain a fully functional configuration management system as

described herein to track design revisions, regardless of whether or not there is a need for a formal intermediate design review.

3.2.4 Final Design Submission

This submittal is required for the design prior to Government acceptance for construction. The requirements for the final design submittal review conferences and the Government's acceptance for start of construction are described herein after.

3.2.5 Design Complete Submittals

After the final design submission and review conference, revise the design to incorporate the comments generated and resolved in the final review conference, perform and document a back-check review and submit the final, design complete documents, which shall represent released for construction documents. The requirements for the design complete submittal are described hereinafter.

3.2.6 Holiday Periods for Government Review or Actions

Do not schedule meetings, Government reviews or responses during the last two weeks of December or other designated Government Holidays (including Friday after Thanksgiving). Exclude such dates and periods from any durations specified herein for Government actions.

3.2.7 Late Submittals and Reviews

If the Contractor cannot meet its scheduled submittal date, it must revise the proposed submittal date and notify the government in writing, at least one (1) week prior to the submittal, in order to accommodate the Government reviewers' other scheduled activities. If a design submittal is over one (1) day late in accordance with the latest revised design schedule, or if notification of a proposed design schedule change is less than seven (7) days from the anticipated design submission receipt date, the Government review period may be extended up to seven (7) days due to reviewers' schedule conflicts. If the Government is late in meeting its review commitment and the delay increases the Contractor's cost or delays completion of the project, the Suspension of Work and Defaults clauses provide the respective remedy or relief for the delay.

3.3 DESIGN CONFIGURATION MANAGEMENT

3.3.1 Procedure

Develop and maintain effective, acceptable design configuration management (DCM) procedures to control and track all revisions to the design documents after the Interim Design Submission through submission of the As-Built documents. During the design process, this will facilitate and help streamline the design and review schedule. After the final design is accepted, this process provides control of and documents revisions to the accepted design (See Special Contract Requirement: Deviating From the Accepted Design). The system shall include appropriate authorities and concurrences to authorize revisions, including documentation as to why the revision must be made. Include the DCM procedures in the Design Quality

Control Plan. The DCM data shall be available to the Government reviewers at all times. The Contractor may use its own internal system with interactive Government concurrences, where necessary or may use the Government's "DrChecks Design Review and Checking Systemn (see below and Attachment C).

3.3.2 Tracking Design Review Comments

Although the Contractor may use its own internal system for overall design configuration management, the Government and the Contractor shall use the DrChecks Design Review and Checking System to initiate, respond to, resolve and track Government design compliance review comments. This system may be useful for other data which needs to be interactive or otherwise available for shared use and retrieval. See Attachment C for details on how to establish an account and set-up the DrChecks system for use on the project.

3.3.3 Design and Code Checklist

Develop and complete various discipline-specific checklists to be used during the design and quality control of each submittal. Submit these completed checklists with each design submittal, as applicable, as part of the project documentation.

3.4 INTERIM DESIGN REVIEWS AND CONFERENCES

3.4.1 General

At least one interim design submittal, review and review conference is required (except that, per paragraph 3.2.1, the Contractor may skip the interim design submission and proceed directly to final design on the sitework and utilities package). The DB Contractor may include additional interim design conferences or over-the-shoulder reviews, as needed, to assure continued government concurrence with the design work. Include the interim submittal review periods and conferences in the project schedule and indicate what part of the design work is at what percentage of completion. The required interim design conference shall be held when interim design requirements are reached as described below. See also Paragraph: Over-the-Shoulder Progress Reviews for a waiver to the formal interim design review.

3.4.2 Procedure

After receipt of an Interim Design submission, allow the Government twenty one (21) calendar days after receipt of the submission to review and comment on the interim design submittal. For each interim design review submittal, the COR will furnish, to the Contractor, a single consolidated, validated listing of all comments from the various design sections and from other concerned agencies involved in the review process using the DrChecks Design Review and Checking System. The review will be for conformance with the technical requirements of the solicitation and the Contractor's RFP proposal. If the Contractor disagrees technically with any comment or comments and does not intend to comply with the comment, he/she must clearly outline, with ample justification, the reasons for noncompliance within five (5) days after receipt of these comments in order that the comment can be resolved. Furnish disposition of all comments, in writing, through DrChecks.

The Contractor is cautioned that if it believes the action required by any comment exceeds the requirements of this contract, that it should take no action and notify the COR in writing immediately. The Interim Review conference will be held at the installation. Bring the personnel that developed the design submittal to the review conference. The conference will take place the week after the receipt of the comments by the Contractor. The parties may agree to alternative conferencing methods, such as teleconferencing, or televideo, where available.

3.4.3 Conference Documentation

3.4.3.lin order to facilitate and accelerate the Government code and contract conformance reviews, the Contractor shall identify, track resolution of and maintain all comments and action items generated during the design process and make this available to the designers and reviewers prior to the Interim and subsequent design reviews.

3.4.3.2The DB Contractor shall prepare meeting minutes and enter final resolution of all comments into DrChecks. Copies of comments, annotated with comment action agreed on, will be made available to all parties before the conference adjourns. Unresolved problems will be resolved by immediate follow-on action at the end of conferences. Incorporate valid comments. The Government reserves the right to reject design document submittals if comments are significant. Participants shall determine if any comments are critical enough to require further design development prior to government concurrence. Participants shall also determine how to proceed in order to obtain government concurrence with the design work presented.

3.5 INTERIM DESIGN REQUIREMENTS

Interim design deliverables shall include drawings, specifications, and design analysis for the part of design that the Contractor considers ready for review.

3.5.1 Drawings

Include comments from any previous design conferences incorporated into the documents to provide an interim design for the "partn submitted.

3.5.2 Design Analyses

The designers of record shall prepare and present design analyses with calculations necessary to substantiate and support all design documents submitted. Address design substantiation required by the applicable codes and references and pay particular attention to the following listed items:

3.5.2. lFor parts including sitework, include site specific civil calculations.

3.5.2.2 For parts including structural work, include structural calculations.

Identify all loads to be used for design.

Describe the method of providing lateral stability for the structural system to meet seismic and wind load requirements. Include sufficient calculations to verify the adequacy of the method.

Provide calculations for all principal roof, floor, and foundation members and bracing and secondary members.

Provide complete seismic analyses for all building structural, mechanical, electrical, architectural, and building features as dictated by the seismic zone for which the facility is being constructed.

Computer generated calculations must identify the program name, source, and version. Provide input data, including loads, loading diagrams, node diagrams, and adequate documentation to illustrate the design. The schematic models used for input must show, as a minimum, nodes/joints, element/members, materials/properties, and all loadings, induced settlements/deflections, etc., and a list of load combinations. Include an output listing for maximum/minimum stresses/forces and deflections for each element and the reactions for each loading case and combination.

See also the Security (Anti-Terrorism) requirements below for members subject to Anti-Terrorist Force Protection (ATFP) and Progressive Collapse requirements

3.5.2.3 For Security (Anti-Terrorism): Provide a design narrative and calculations where applicable, demonstrating compliance with each of the 22 standards in UFC 4-010-01, which includes Design of Buildings to Resist Progressive Collapse (use the most recent version of UFC 3-301-01). Where sufficient standoff distance is not being provided, show calculations for blast resistance of the structural system and building envelope. Show complete calculations for members subjected to ATFP loads, e.g., support members of glazed items (jambs, headers, sills) connections of windows to support members and connections of support members to the rest of the structure. For 2 story and higher buildings, provide calculations to demonstrate compliance with progressive collapse requirements.

3.5.2.4 For parts including architectural work, include building floor area analysis.

3.5.2.5 For parts including mechanical work, include HVAC analysis and calculations. Include complete design calculations for mechanical systems. Include computations for sizing equipment, air duct design including associated diffusers and grilles, refrigerant pipe design, equipment condensate pipe design, and U-factors for ceilings, roofs and exterior walls and floors. Contractor shall employ commercially available energy analysis techniques to determine the energy performance of all passive systems and features. Use of hourly energy load computer simulation is required (see paragraph 3.5.6.2 for list of acceptable software). Based on the results of calculations, provide a complete list of the materials and equipment proposed with the manufacturer's published cataloged product installation specifications and roughing-in data.

3.5.2.6 For parts including life safety, include building code analysis. Notwithstanding the requirements of the Codes, address the following:

a) A registered fire protection engineer (FPE) must perform all fire protection analyses. Provide the fire protection engineer's qualifications. See Section 01 11 00, paragraph 5 for qualifications.
b) Provide all references used in the design including Government design documents and industry standards used to generate the fire protection analysis.

3.5.2.7 For parts including plumbing systems:

a) List all references used in the design.
b) Provide justification and brief description of the types of plumbing fixtures, piping materials and equipment proposed for use.
c) Detail calculations for systems such as sizing of domestic hot water heaters, hot water recirculation pumps, expansion tanks, and associated piping; domestic cold water piping, sanitary sewer and vent piping, natural gas piping; etc., as applicable.
d) When the geotechnical report indicates expansive soils are present, indicate in the first piping design submittal how piping systems will be protected against damage or backfall/backflow due to soil heave (from penetration of slab to the 5 foot building line)

3.5.2.8 For parts including electrical work, include lighting calculations to determine maintained foot-candle levels, electrical load analysis and generator calculations, voltage drop for power flow, electrical short circuit and protective device coordination analysis and arc fault calculations.

3.5.2.9 For parts including telecommunications voice/data (including SIPRNET, where applicable), include analysis for determining the number and placement of outlets.

3.5.2.10 For Cathodic Protection Systems, provide the following stamped report by the licensed corrosion engineer or NACE specialist with the first design submission. The designer must be qualified to engage in the practice of corrosion control of buried or submerged metallic surfaces. He/she must be accredited or certified by the National Association of Corrosion Engineers (NACE) as a NACE Accredited Corrosion Specialist or a NACE certified Cathodic Protection Specialist, or must be a registered professional engineer with a minimum of five years' experience in corrosion control and cathodic protection, Clearly describe structures, systems or components in soil or water to be protected. Describe methods proposed for protection of each.

3.5.2.11 Air Barrier System: Provide a narrative of the design and installation requirements for the Air Barrier system. As part of the design quality control process an air barrier consultant shall review drawing details to assure that details of critical Air Barrier components are properly detailed and incorporated during the design drawings and process (i.e., window flashing details, penetration in

air barrier details, door flashing details, roofing/ceiling barrier interface details and etc.). Furnish the Government written review details and results.

3.5.2.12 Life Cycle Cost Analysis (LCCA) Documentation: N/A

3.5.3 Geotechnical Investigations and Reports

3.5.3. lThe contractor's licensed geotechnical engineer shall prepare a final geotechnical evaluation report, to be submitted along with the first foundation design submittal. Make this information available as early as possible during the over-the-shoulder progress review process. Summarize the subsurface conditions and provide recommendations for the design of appropriate utilities, foundations, floor slabs, retaining walls, embankments, and pavements. Include acceptable material types and compaction requirements for fill and backfill under buildings, sidewalks, other structures and open areas. On-site material shall not be used for fill or backfill; all fill and backfill material shall be imported from off site. Recommend foundation systems to be used, allowable bearing pressures for footings, lateral load resistance capacities for foundation systems, elevations for footings, grade beams, slabs, etc. Provide an assessment of post-construction settlement potential including total and differential. Provide recommendations regarding lateral earth pressures (active, at-rest, passive) to be used in the design of retaining walls. Include the recommended spectral accelerations and Site Class for seismic design along with an evaluation of any seismic hazards and recommendations for mitigation, if required. Include calculations to support the recommendations for bearing capacity, settlement, and pavement sections. Include supporting documentation for all recommended design parameters such as Site Class, shear strength, earth pressure coefficients, friction factors, subgrade modulus, California Bearing Ratio (CBR), etc. Provide earthwork recommendations, expected frost penetration, expected groundwater levels, recommendations for dewatering and groundwater control and the possible presence of any surface or subsurface features that may affect the construction of the project such as sinkholes, boulders, shallow rock, old fill, old structures, soft areas, or unusual soil conditions. Include pH tests, salinity tests, resistivity measurements, etc., required to design corrosion control and grounding systems. Include the raw field data. Arrange a meeting with the Government subsequent to completion and evaluation of the site specific geotechnical exploration to outline any differences encountered that are inconsistent with the Government provided preliminary soils information. Clearly outline differences which require changes in the foundation type, or pavement and earthwork requirements from that possible and contemplated using the Government furnished preliminary soils investigation, which result in a change to the design or construction. Any equitable adjustment is subject to the provisions of the contract's Differing Site Conditions Clause.

3.5.3.2 Vehicle Pavements: The Contractor's geotechnical report shall contain flexible and rigid pavement designs, as applicable for the project, including design CBR and modulus of subgrade reaction and the required compaction effort for subgrades and pavement layers. Provide Information on the types of base course materials available in the area and design strengths.

3.5.3.3 The Contractor and the professional geotechnical engineer consultant shall certify in writing that the design of the project has been developed consistent with the Contractor's final geotechnical report. The certification shall be stamped by the consulting professional geotechnical engineer and shall be submitted with the first design submission. If revisions are made to the initial design submission, a new certification shall be provided with the final design submission.

3.5.3.4 Open Ground Cloud

A detailed and accurate description of drilling and sample information must be kept using an electronic tablet with Dataforensics' pLog software or industry equivalent. This data must be uploaded to USACE's OpenGround Cloud (OGC) database to generate boring logs and photo documentation reports as per ER 1110-1-8178 (2025). The OGC template furnished by the Government must be used. The Contractor is responsible for coordinating with the SWL OGC Data Champion for cloud access and templates.

3.5.4 LEED Documentation: N/A

3.5.5 Energy & Sustainability Record Card

Report compliance with all energy and sustainability criteria for each facility in the project at the Final Design submittal and contract completion. The available data will be compiled using the Energy & Sustainability Record Card (Excel Workbook). The Energy & Sustainability Record Card and its instructions for use can be downloaded from the following link:

https://www.wbdg.org/FFC/ARMYCOE/SDP/Army_SustainabilityReportCard_2020.pdf

3.5.6 Energy Conservation

3.5.6.lRefer to Section 01 11 00, Paragraph 5. Interim and Final Design submittals shall demonstrate that each building including the building envelope, HVAC systems, service water heating, power, and lighting systems meet the Mandatory Provisions and the Prescriptive Path requirements of ASHRAE 90.1. Use Compliance Documentation forms available from ASHRAE and included in the ASHRAE 90.1 User's Manual for this purpose. The Architectural Section of the Design Analysis shall include completed forms titled "Building Envelope Compliance Documentation Parts I and II". The Heating Ventilating and Air Conditioning (HVAC) Section of the Design Analysis shall include a completed form titled "HVAC Simplified Approach Option - Part I" if this approach is allowed by the Standard. Otherwise, the HVAC Section of the Design Analysis shall include completed forms titled "HVAC Mandatory Provisions - Part II" and "HVAC Prescriptive Requirements -

Part III". The Plumbing Section of the Design Analysis shall include a completed form titled "Service Water Heating Compliance Documentation". The Electrical Section of the Design Analysis shall include an explanatory statement on how the requirements of ASHRAE 90.1 Chapter 8 Power were met. The Electrical Section of the Design Analysis shall also include a completed form titled "Lighting Compliance Documentation".

3.5.6.2 Interim and Final Design submittals which address energy consuming systems, (heating, cooling, service hot water, lighting, power, etc.) must also include calculations in a separate Energy Conservation Section of the Design Analysis which demonstrate and document (a) the baseline energy consumption for the facility or facilities under contract, that would meet the requirements of ANSI/ASHRAE/IESNA Standard 90.1 and (bl the energy consumption of the facility or facilities under contract utilizing the materials and methods required by this construction contract. Use the USGBC Energy and Atmosphere (EA) Credit 1 compliance template/ form or an equivalently detailed form for documenting compliance with the energy reduction requirements. This template/ form is titled PERFORMANCE RATING METHOD and is available when the project is registered for LEED. The calculation methodology used for this documentation and analysis shall follow the guidelines set forth in Appendix G of ASHRAE 90.1, with two exceptions: a) receptacle and process loads may be omitted from the calculation; and b) the definition of the terms in the formula for Percentage Improvement found in paragraph Gl.2 are modified as follows: Baseline Building Performance shall mean the annual energy consumption calculated for a building design intended for use as a baseline for rating above standard design meeting the minimum requirements of the energy standard, and Proposed Building Performance shall mean annual energy consumption calculated for the proposed building design intended for construction. This calculation shall address all energy consuming systems in a single integrated methodology. Include laboratory fume hoods and kitchen ventilation loads in the energy calculation. They are not considered process loads. Individual calculations for heating, cooling, power, lighting, power, etc. systems will not be acceptable. The following building simulation software is acceptable for use in calculating building energy consumption: Hourly Analysis Program (HAP) by Carrier Corp., TRACE 700 by Trane Corp., DOE-2 by US Department of Energy, EnergyPlus by DOD/DOE.

3.5.7 Specifications

Specifications shall utilize the Unified Facility Guide Specifications (UFGS using MASTERFORMAT 2026 numbering system). The UFGS are available through the "Whole Building Design Guiden website, using a websearch engine. Manufacturers' product specifications, utilizing CSI's Manu-Spec, three part format may also be used in conjunction with the UFGS. The designers of record shall edit and expand the appropriate Specifications to ensure that all project design requirements, current code requirements, and regulatory requirements are met. Specifications shall clearly identify, where appropriate, specific products chosen to meet the contract requirements

(i.e., manufacturers' brand names and model numbers or similar product information). Note that the UFGS are NOT written for Design-Build and must be edited appropriately. For instance, they assume that the Government will approve most submittals, whereas in Design-Build, the Designer of Record has that action, unless this Solicitation requires Government approval for specific submittals. The Designer of Record should also note that some UFGS sections might either prescribe requirements exceeding the Government's own design standards in applicable references or contain requirements that should be selected where appropriately required by the applicable references. At any rate, where the UFGS are consistent with other major, well known master commercial guide specifications, then generally retain such requirements, as good practices.

3.5.8 Interim Building Design Contents

The following list represents what the Government considers should be included in the overall completed design for a facility or project. It is not intended to limit the contractor from providing different or additional information as needed to support the design presented, including the require design analyses discussed above. These pieces shall be developed as the design progresses toward the design complete stage.

3.5.8.1Lawn and Landscaping Irrigation System

3.5.8.2Landscape, Planting and Turfing

3.5.8.3Architectural

a) Design Narrative
b) Architectural Floor Plans, Typical Wall and Roof Sections, Elevations
c) Finish schedule
d) All required equipment
e) Special graphics requirements
f) Door and Window Schedules
g) Hardware sets using BHMA designations
h) Composite floor plan showing all pre-wired workstations
i) Comprehensive Interior Design Package (CID)
j) Structural Interior Design (SID) package: See ATTACHMENT A for specific requirements
k) Furniture, Fixtures & Equipment (FF&E) design package: See ATTACHMENT B for specific requirements
1) Air Barrier Design: Details of all Air Barrier components, (i.e., window flashing details, penetrations in air barrier details, door flashing details, roofing/ceiling barrier interface details etc.)

3.5.8.4Structural Systems Include:

a) Drawings showing principal members for roof and floor framing plans as applicable
b) Foundation plan showing main foundation elements where applicable
c) Typical sections for roof, floor, and foundation conditions

3.5.8.5Plumbing Systems

a) Show locations and general arrangement of plumbing fixtures and

major equipment

b) Plan and isometric riser diagrams of all areas including hot water, hot water circulation, cold water, waste and vent piping. Include natural gas and meter and other specialty systems as applicable.

c) Include equipment and fixture connection schedules with descriptions, capacities, locations, connection sizes and other information as required.

d) Plumbing legend and applicable notes.

e) Room designations.

3.5.8.6 HVAC Systems

a) Mechanical Floor Plans: The floor plans shall show all principle architectural features of the building which will affect the mechanical design. The floor plans shall also show the following:
    1) Room designations.
    2) Mechanical legend and applicable notes.
    3) Location and size of all ductwork and piping.
    4) Location and capacity of all terminal units (i.e., registers, diffusers, grilles, VAV boxes).
    5) Pre-Fabricated Paint Spray Booth (where applicable to project scope)
    6) Exhaust fans and specialized exhaust systems.
    7) Thermostat location.
    8) Location of all air handling equipment.
    9) Air balancing information.
    10) Design weather conditions including associated weather station information.
    11) Design space temperature and relative humidity setpoints.

b) Equipment Schedule: Provide complete equipment schedules. Include:
    1) Capacity
    2) Electrical characteristics
    3) Efficiency (if applicable)
    4) Manufacturer's name
    5) Optional features to be provided
    6) Physical size
    7) Minimum maintenance clearances

c) Details: Provide construction details, sections, elevations, etc., only where required for clarification of methods and materials of design.

d) HVAC Controls: Submit complete HVAC controls equipment schedules, sequences of operation, wiring and logic diagrams, Input/Output Tables, equipment schedules, and all associated information. See the Statement of Work for additional specific requirements

3.5.8.7 Electrical Systems

a) Electrical Floor Plans: The floor plans shall show all principle architectural features of the building which will affect the electrical design. The floor plans shall also show the following:
    1) Room designations

2) Electrical legend and applicable notes.
3) Lighting fixtures properly identified.
4) Switches for control of lighting.
5) Receptacles. Power and power connections to HVAC/Plumbing system, fire alarm/fire protection system, telecommunication and security system.
6) Location and designation of panelboards. Clearly indicate type of mounting required (flush or surface) and reflect accordingly in specifications.
7) Service entrance (conduit and main disconnect).
8) Location, designation and rating of motors and/or equipment which requires electrical service. Show method of termination and/or connection to motors and/or equipment. Show necessary junction boxes, disconnects, controllers (approximate only), conduit stubs, and receptacles required to serve the motor and/or equipment.

b) Building Riser Diagram(s) (from pad-mounted transformer to unit load center panelboard): Indicate the types and sizes of electrical equipment and wiring. Include grounding and metering requirements.
c) Switchboard and Panelboard Schedule(s): Indicate the following information:
   1) Panelboard Characteristics (Panel Designation, Voltage, Phase, Wires, Main Breaker Rating and Mounting.
   2) Branch Circuit Designations.
   3) Load Designations.
   4) Circuit Breaker Characteristics. (Number of Poles, Trip Rating, AIC Rating)
   5) Branch Circuit Connected Loads (AMPS).
   6) Special Features
d) Lighting Fixture Schedule(s): Indicate the following information:
   1) Fixture Designation.
   2) General Fixture Description.
   3) Number and Type of Lamp(s).
   4) Type of Mounting.
   5) Special Features.
e) Details: Provide construction details, sections, elevations, etc. only where required for clarification of methods and materials of design.
f) Lightning Protection System (LPS) shop drawings if recommended and required to be installed. Shop drawings must be designed and certified from a lightning protection institute. Include the system details, components and material.

3.5.8.8 Electronic Systems including the following responsibilities

a) Fire Detection and Alarm System. Design shall include layout drawings for all devices and a riser diagram showing the

control panel, annunciator panel, all zones, radio transmitter and interfaces to other systems (HVAC, sprinkler, etc.)

b) Fire Suppression System Control. Specify all components of the Fire Suppression (FS) System in the FS section of the specifications. Clearly describe how the system will operate and interact with other systems such as the fire alarm system. Include a riser diagram on the drawings showing principal components and interconnections with other systems. Include FS system components on drawing legend. Designate all components shown on floor plans "FS system components" (as opposed to "Fire Alarm components"). Show location of FS control panels, HVAC control devices, sensors, and 120V power panel connections on floor plans. Indicate zoning of areas by numbers (1, 2, 3) and detectors sub- zoned for cross zoning by letter designations (A and B). Differentiate between ceiling mounted and under floor detectors with distinct symbols and indicate sub-zone of each.
c) Public Address System
d) Special Grounding Systems. Completely reflect all design requirements in the specifications and drawings. Specifications shall require field tests (in the construction phase), witnessed by the Government, to determine the effectiveness of the grounding system. Include drawings showing existing construction, if any.
e) Cathodic Protection.
f) Intrusion Detection, Card Access System
g) Central Control and Monitoring System
h) Mass Notification System
i) Electrical Power Distribution Systems

3.5.8.9 Separate Detection System Telecommunications drawings for Information Systems including the following responsibilities

a) Telecommunications Cabling
b) Supporting Infrastructure
c) Outside Plant (OSP) Cabling - Campus or Site Plans - Exterior Pathways and Inter-Building Backbones
d) Include a layout of the voice/data outlets (including voice only wall & pay phones) on telecommunication floor plan drawing, location of SIPRNET data outlets (where applicable), and a legend and symbol definition to indicate height above finished floor. Show size of conduit and cable type and size on Riser Diagram. Do not show conduit runs between backboard and outlets on the floor plans. Show underground distribution conduit and cable with sizing from point of presence to entrance facility of building.
e) Layout of complete building per floor - Serving Zone Boundaries, Backbone Systems, and Horizontal Pathways including Serving Zones Drawings - Drop Locations and Cable ID'S.

f) Communication Equipment Rooms - Plan Views - Tech and AMEP/Elevations - Racks and Walls. Elevations with a detailed look at all telecom rooms. Indicate technology layout (racks, ladder-racks, etc.), mechanical/electrical layout, rack elevation and backboard elevation. They may also be an enlargement of a congested area of Tl or T2 series drawing.

3.5.9 Civil Site and Utilities Design Contents

Include the following in the interim design for the site and utilities. This list is not intended to limit the contractor from providing different or additional information as needed to support the design presented.

a) Storm drainage design
b) Pavement design in coordination with the geotechnical investigation report.
c) Location and vicinity maps
d) Removal and/or relocation plan
e) Layout plan
f) Grading and drainage plan
g) Utility Plan: Identify and locate water lines, sanitary sewer lines, force mains, industrial waste lines, natural gas lines including pressure, and other subsurface utility features
h) Road and parking area profiles
i) Utility Profiles: Indicate invert elevations of all drainage structures, manholes, storm drainpipe with size and invert elevations, ground profile, and new or existing structures or utilities crossing the new utilities.
j) Civil details sheet
k) Concrete Joint Plan: Provide a joint layout plan for each concrete apron, hardstands, road, pavement, etc.
1) Erosion and Sediment Control Plan
m) Landscape, planting and turfing
n) Site specific civil calculations

3.6 FINAL DESIGN REVIEWS AND CONFERENCES

A final design review and review conference will be held upon completion of final design at the project installation, or - where equipment is available - by video teleconference or a combination thereof, for the design to receive Government acceptance to allow release of the design for construction. The parties may agree on alternative reviews and conferences (e.g., conference calls and electronic file sharing, etc.). Include the final design conference in the project schedule and shall indicate what part of the design work is at 100% completion. The final design conference will be held after the Government has had twenty one (21) calendar days after receipt of the submission to review the final design and supporting data.

3.7 FINAL DESIGN REQUIREMENTS

Final design deliverables shall consist of 100% complete drawings, specifications, submittal register and design analyses for Government review and acceptance. The 100% design submission shall consist of drawings,

specifications, updated design analyses and any permits required by the contract. In order to expedite the final design review, prior to the conference, ensure that the design configuration management data and all review comment resolutions are up-to-date. Include the 100% SID and 100% FF&E binders for government approval. The Contractor shall have performed independent technical reviews (ITR's) and back-checks of previous comment resolutions, as required by Section 01 45 00.00 10 CONTRACTOR QUALITY CONTROL, including providing documentation thereof. Use DrChecks or other acceptable comment tracking system during the ITR and submit the results with the final design

3.7.1 Drawings

3.7.1. lSubmit drawings complete with all contract requirements incorporated into the documents to provide a 100% design.

3.7.1.2 Prepare all drawings with the Computer-Aided Design and Drafting (CADD)/Computer-Aided Design (CAD) system, organized and easily referenced electronically, presenting complete construction information.

3.7.1.3Drawings shall be complete. The Contractor is encouraged to utilize graphics, views, notes, and details which make the drawings easier to review or to construct but is also encouraged to keep such materials to those that are necessary.

3.7.1.4 Provide detail drawings that illustrate conformance with the contract. Include room finish schedules, corresponding color/finish/special items schedules, and exterior finish schedules that agree with the submitted SID binders.

3.7.1.5 The design documents shall be in compliance with the latest version of the A/E/C CAD Standard, available at https://cadbimcenter.erdc.dren.mil/. Use the approved vertical Corps of Engineers title blocks and borders on all drawings with the appropriate firm name included within the title block area.

3.7.1.6 CAD Systems: (NOTE: If this is a Single Award or Multiple Award, Indefinite Delivery/Indefinite Quantity Contract, this information will be provided for each task order.) All CAD files shall be fully compatible with the latest version AutoCAD.

3.7.1.7 Electronic Drawing Files:

In addition to the native CAD design files, provide separate electronic drawing files in Portable Document Format (PDF) for each project drawing.

Each drawing file (both CAD and PDF) shall represent one complete drawing from the drawing set, to include the date, submittal phase, and border. Fonts that are not allowable by the A/E/C CAD Standard are not acceptable in delivered CAD files. All displayed graphic elements on all levels of the drawing files shall be part of the project drawing image. The drawing files shall not contain any graphic element that is not part of the drawing image.

3.7.1.8Drawing Index. Provide an index of drawing sheets in CAD as part of

the drawing set, and an electronic list in Microsoft Excel of all drawings on the CD. Include the electronic file name, the sheet reference number, the sheet number, and the sheet title, containing the data for each drawing.

3.7.1.9 Hard Copies: Plot submitted hard copy drawings directly from the "electronic drawing files" and copy for quantities and sizes indicated in the distribution list at the end of this specification section. The Designers of Record shall stamp, sign and date original hard copy sheets as Released For Construction, and provide copies for distribution from this set.

3.7.1.10 Georeferenced Data

During the design development capture geo-referenced coordinates of all changes made to the existing site (facility footprint, utility line installations and alterations, roads, parking areas, etc.) as a result of this contract. Currently, there is no mandatory methodology for how the geo-referenced coordinates will be captured. Close-out requirements at the as-built stage; require final geo-referenced GIS Database of the new facility along with all exterior modifications. See also, Section 01 78 00 Closeout Submittals.

GIS Data. Unless superseded by local requirements, the GIS database deliverable shall follow a standard template provided to the Contractor by the Government, adhere to the Spatial Data Standards for Facilities, Infrastructure and Environment (SDSFIE) Army. Adaptation and be documented using the DISDI Geospatial Metadata Profile (DGMP) standard. The electronic deliverables for GIS shall be in Intergraph GeoMedia. The deliverable shall specify the coordinate system, projection, datum(s), and units defined for the data layer in the metadata. The vertical coordinate information shall be stored as a feature attribute when applicable and documented in the metadata.

3.7.2 Design Analysis

3.7.2. lThe designers of record shall update, finalize and present design analyses with calculations necessary to substantiate and support all design documents submitted.

3.7.2.2 The responsible DOR shall stamp, sign and date the design analysis. Identify the software used where, applicable (name, version, vendor) Generally, provide design analyses, individually, in an original (file copy) and one copy for the assigned government reviewer.

3.7.2.3 All disciplines review the LEED design analysis in conjunction with their discipline-specific design analysis; include a copy of the separable LEED design analysis in all design analysis submittals.

3.7.2.4 Do not combine multi-disciplined volumes of design-analysis, unless multiple copies are provided to facilitate multiple reviewers (one copy per each separate design analysis included in a volume).

3.7.3 Specifications

Specifications shall be 100% complete and in final form.

3.7.4 Submittal Register

Prepare and update the Submittal Register and submit it with the 100% design specifications (see Specification Section 01 33 00, SUBMITTAL PROCEDURES) Include the required submittals for each specification section in the submittal register.

3.7.5 Preparation of DD Form 1354 (Transfer of Real Property)

This form itemizes the types, quantities and costs of various equipment and systems that comprise the project, for the purpose of transferring the new construction project from the Corps Construction Division to the Installation's inventory of real property. The Government will furnish the DB Contractor's design manager a DD Form 1354 checklist to use to produce a draft Form 1354. Submit the completed checklist and prepared draft Form DD 1354 with the 100% design in the Design Analysis. USACE will use these documents to complete the final DD 1354 upon completion of construction.

3.7.6 Acceptance and Release for Construction

3.7.6.1 At the conclusion of the Final Design Review (after resolutions to the comments have been agreed upon between DOR and Government reviewers), the Contracting Officer or the ACO will accept the Final Design Submission in writing and allow construction to start. The Government may withhold acceptance until all major corrections have been made or if the final design submission requires so many corrections, even though minor, that it is not considered acceptably complete.

3.7.6.2 Government review and acceptance of design submittals is for contract conformance only and shall not relieve the Contractor from responsibility to fully adhere to the requirements of the contract, including the Contractor's accepted contract proposal, or limit the Contractor's responsibility of design as prescribed under Special Contract Requirement: "Responsibility of the Contractor for Designn or limit the Government's rights under the terms of the contract. The Government reserves the right to rescind inadvertent acceptance of design submittals containing contract deviations not separately and expressly identified in the submittal for Government consideration and approval.

3.8 DESIGN COMPLETE CONSTRUCTION DOCUMENT REQUIREMENTS

After the Final Design Submission and Review Conference and after Government acceptance of the Final Design submission, revise the design documents for the design package to incorporate the comments generated and resolved in the final review conference, perform and document a back-check review and submit the final, design complete documents. Label the final design complete documents "FOR CONSTRUCTIONn or use similar language. In addition to the final drawings and specifications, the following deliverables are required for distribution and field use. The deliverable includes all documentation and supporting design analysis in final form, as well as the final review comments, disposition and the back-check. As part of the quality assurance process, the Government may perform a back-check of the released for construction documentation. Promptly correct any errors or omissions found

during the Government back-check. The Government may withhold retainage from progress payments for work or materials associated with a final design package until this submittal has been received and the Government determines that it is complete.

3.9 SUBMITTAL DISTRIBUTION, MEDIA AND QUANTITIES

3.9.1 Submittal Distribution and Quantities

General: The documents which the Contractor shall submit to the Government for each submittal are listed and generally described in preceding paragraphs in this Section. Provide copies of each design submittal and design substantiation as follows (NOTE: If this is a Single Award or Multiple Award, Indefinite Delivery/Indefinite Quantity Contract, this information will be provided for each task order).

Remainder of the page space is intentionally left blank.

Activity and Address	Drawing Size (Full Size) Full Sets/ *Partial Sets	Design Analyses & Specs Full Sets/ *Partial Sets	Drawing Size (Half Size) - Full Sets/ *Partial Sets	Data CD-ROM or DVD as Necessary (PDF& .dwg)	Furniture Submittal (Per Attachment B)	Structural Interior Design Submittal (Per Attachment A)	Permits
USACE - SWL	0/0	3/3	3/3	2	1	1	1
Commander, U.S. Army Engineer District, Center of Standardization Omaha District CENWO-ED-D	0/0	2/2	2/2	3	0	0	2
Installation Pine Bluff Arsenal	1/1	2/2	2/2	2	1	1	1
U.S.Army Corps of Engineers Construction Area	2/2	2/2	2/2	1	1	1	2

***NOTE: For partial sets of drawings, specifications and design analyses, see paragraph 3.9.3.3, below.**

****NOTE: When specified below in 3.9.2, furnish Installation & ARNG copies of Drawings as paper copies, in lieu of the option to provide secure web-based submittals.**

3. 9. 2. Mailing of Design Submittals

3.9.2.1 Mail all design submittals to the Government during design and construction, using an overnight mailing service. The Government will furnish the Contractor addresses where each copy shall be mailed to after award of the contract (or individual task order if this is an indefinite delivery/indefinite quantity, task order contract).Assemble drawing sheets, specs, design analyses, etc. into individual sets; do not combine duplicate pages from individual sets so that the government has to assemble a set.

3.9.2.2 Each design submittal shall have a transmittal letter accompanying it indicating the date, design percentage, type of submittal, list of items submitted, transmittal number and point of contact with telephone number.

3.9.2.3 Provide partial sets of drawings, specifications, design analyses, etc., as designated in the Table in paragraph 3.9.1, to those reviewers who only need to review their applicable portions of the design, such as the various utilities. The details of which office receives what portion of the design documentation will be worked out after award.

3.10 AS-BUILT DOCUMENTS

Provide as-built drawings and specifications in accordance with Section 01 78 00, CLOSEOUT SUBMITTALS. Update LEED design phase documentation during construction as needed to reflect construction changes and advancing project completion status (example - Commissioning Plan updates during construction phase) and include updated LEED documentation in construction closeout submittal.

ATTACHMENT A STRUCTURAL INTERIOR DESIGN (SID) REQUIREMENTS
ATTACHMENT B FURNITURE, FIXTURES AND EQUIPMENT REQUIREMENTS
ATTACHMENT C TRACKING COMMENTS IN DRCHECKS

--End of Section

ATTACHMENT A
STRUCTURAL INTERIOR DESIGN (SID) REQUIREMENTS

1.0 GENERAL INFORMATION

Structural Interior Design includes all building related elements and components generally part of the building itself, such as wall finishes, ceilings finishes, floor coverings, marker/bulletin boards, blinds, signage and built-in casework. Develop the SID in coordination with the furniture (FF&E) layouts.

2.0 STRUCTURAL INTERIOR DESIGN (SID) REQUIREMENTS FOR THE INTERIM AND FINAL DESIGN SUBMITTAL$

2.1 FORMAT AND SCHEDULE

Prepare and submit for approval the interior and exterior building finishes scheme for an interim design submittal. The DOR shall meet with and discuss the finish requirements with the appropriate Government officials prior to preparation of the schemes to be presented. Present physical samples of the schemes to reviewers at an interim design conference.

The physical samples can be photographed and presented digitally in a tabletop layout if the design conference is virtual. At the conclusion of the interim phase, after resolutions to the comments have been agreed upon between DOR and Government reviewers, the Contractor may proceed to final design with the interior and exterior finish schemes presented.

The SID information and samples are to be submitted in 8 ½" x 11" format and organized into three ring binders. Binders shall have pockets on the inside and clear sleeve fronts to display a cover and spine insert. Use more than one binder if the samples do not allow for the binder to sit square. Over full binder will not be accepted. Large D-ring binders are preferred to 0-ring binders. Use clear page protector sleeves that are strong enough to keep pages from tearing out. Anchor large or heavy samples with mechanical fasteners or Velcro tape rather than rubber cement or glue. Fold out items must have a maximum spread of 17". Provide cover and spine insert sheets identifying the document as "Structural Interior Design" package. Include the project title and location, project number, Contractor/A/E name and phone number(s), submittal stage and date on the cover and spine insert. The SID physical binder shall be submitted at all deliverable phases.

Design submittal requirements include, but are not limited to:

2.1.1 Narrative of the Structural Interior Design Objectives

The SID shall include a narrative that discusses the building related finishes. Include topics that relate to base standards, life safety, sustainable design issues, aesthetics, durability and maintainability.

Describe the development and features as they relate to the occupant requirements and the building design.

2.1.2 Interior Color Boards

Identify and key each item on the color boards to the contract documents to provide a clear indication of how and where each item will be used. Arrange finish samples by finish type. Label all samples on the color boards with the manufacturer's name, style and color name, number, and size if applicable. Key or code samples to match key code system used on contract drawings.

Material and finish samples shall indicate true pattern, color and texture. Finish samples must be large enough to show a complete pattern or pattern repeat where practical. Provide photographs or colored photocopies of materials or fabrics that have large overall patterns in conjunction with actual samples to show actual colors. Color board samples shall reflect all actual finish textures, patterns and colors as specified.

Color boards shall include but not be limited to physical color samples of the following:

- All wall finishes and ceiling finishes, including corner guards, wainscoting and wall guards/chair rail finishes
- All flooring finishes, including patterns, and wall base
- All door, door frame and door hardware finishes
- All signage, toilet partitions, locker finishes operable/folding partitions and trims
- All millwork materials and finishes (cabinets, counter tops, etc.)
- All window frame finishes and window treatments (sills, blinds, etc.)

2.1.3 Exterior Color Boards

Prepare exterior finishes color boards in similar format as the interior finishes color boards, for presentation to the reviewers during an interim design conference. Provide physical color samples of all exterior finishes including but not limited to the following:

- All Roof Finishes
- All Exterior Insulation and Finish Samples
- All Glass Color Samples
- All Exterior Metals Finishes
- All Window & Door Frame Finishes
- All Specialty Item Finishes, including trim

Identify each item on the exterior finishes color boards and key to the building elevations to provide a clear indication of how and where each item will be used.

2. 2. STRUCTURAL INTERIOR DESIGN DOCUMENTS

2.2.1 General

Structural interior design related drawings must indicate the placement of extents of SID material, finishes and colors and must be sufficiently detailed to define all interior work. All SID drawings are part of the construction documents, and a copy shall be provided in the SID binder. All drawings in the binder shall be presented in llx17 format and folded in an accordian style fold so that when it is folded in, it matches 8.5nx11n pages. The following is a list of minimum requirements:

2.2.2 Finish Color Schedule

Provide finish color schedule(s) in the contract documents. Provide a finish code, material type, manufacturer, series, style, size and color designations. Key the finish code to the color board samples and drawings.

2.2.3 Interior Finish Plans

Indicate wall finished and accents, and floor patterns and color placement, material transitions and extents of all interior finishes.

2.2.4 Furniture Layout Plans

Provide furniture layout plans showing the outline of all freestanding and systems furniture for coordination of all other disciplines.

2.2.5 Interior Signage

Include interior signage plans or schedules showing location and quantities of all interior signage. Key each interior sign to a quantitative list indicating size, quantity of each type, and signage text.

2.2.6 Interior Elevations, Sections and Details that indicate material, color and finish placement.

ATTACHMENT B
FURNITURE, FIXTURES & EQUIPMENT (FF&E) REQUIREMENTS

1.0 FF&E REQUIREMENTS FOR THE INTERIM AND FINAL DESIGN SUBMITTAL$

1.1. GENERAL

1.1.1 Scope and Design Direction

This section provides instructions, requirements, and responsibilities for the design of the Furniture, Fixtures, and Equipment (FF&E). FF&E design is the selection, layout, specification and documentation of furniture. This furniture shall include but not be limited to:

A. Freestanding furniture (seating, tables, file cabinets, desks, wood casegoods, storage cabinets, bookcases, etc.)
B. Furniture Systems (workstations, benching)
C. Non-Mission Unique Equipment (residential refrigerators, industrial shelving, workbenches, etc.)
D. Accessories (lamps, artificial plants, trash receptacles, re-cycle containers, etc.)

1.1.1.1 Project Requirements

The DOR shall interview appropriate Government personnel to determine furniture and equipment requirements prior to development of the FF&E design. The information gathered during these interviews shall include (1) the number of personnel to occupy the building,

(2) job functions and related furniture/office equipment needed to support the job function, (3) room functions, (4) rank and grade, and 5) any applicable Army facility standards.

1.1.1.2. Design Direction

The FF&E package shall be designed concurrently with the building design. Coordinate the FF&E package with the following:

A. Interior finish selections and generic furniture layout plans developed as part of the Structural Interior Design (SID); referenced in Section 01 33 16 Attachment A.
B. Building electrical outlets, switches, J-boxes, communication outlets and connections, and lighting as appropriate.
C. Other building features such as architectural elements, thermostats, location of TV's, mission unique equipment (MUE), etc.
D. Locate furniture in front of windows only if the top of the item falls below the window and unless otherwise noted, do not attach furniture including furniture systems to the building. The only exception to this are markerboards and tack boards.
E. If a project has SIPRNET and/or NIPRNET, coordinate furniture layout with SIPRNET and NIPRNET separation requirements. The DOR shall take special note of any Network Enterprise Center (NEC) requirements regarding the location of secure (SIPRNET) surface mounted conduit or

raceways with associated clearances, wall drops, and wall lock boxes in order to coordinate with the location of workstations and desks that are to have SIPRNET accessibility. Verify that access required by NEC for SIPRNET box and conduit is provided.

Executive wood casegoods shall be based on the facility type and rank of end user. Typically, this is limited to command suites or to those areas specified by the Installation POC and when applicable Installation Design Guide for FF&E's.

All FF&E design documents shall be developed by the DOR. Space planning and workstation drawings shall be generic. Reference paragraph 1.3.2.1. for additional requirements. The use of manufacturer representatives or dealers shall be limited to providing specification and cost information only.

1.1.2 Mission Unique Equipment

Funding for FF&E furniture items and mission unique equipment (MUE) items are from two different sources. Identify locations on the FF&E drawings of known MUE items for space planning purposes. Any FF&E items required by the User that cannot be procured by HNC and are therefore MUE must be clearly identified on FF&E drawings as Not in Contract (NIC), unless otherwise directed.

MUE includes, but is not limited to, items such as:

A. Most commercial appliances
B. IT equipment (photocopiers, printers, etc.)
C. AV equipment (projectors, smart boards, flat screen display monitors, AV racks, AV carts)
D. Floor safes
E. Shredders
F. Clocks

The User will purchase and install mission unique equipment items, unless otherwise noted.

1.1.3 Sources

GSA Schedule manufacturers and products shall be utilized in selection of FF&E for this project. Open market sources can be specified when an item is not available on GSA Schedule. Use shall be minimized ($3,000 per line item/$25,000 per contract) and shall not be specified without written justification. The DOR shall make a concerted effort to exclude items with proprietary features which would prevent competition.

The DOR shall attempt to specify furnishings from within a manufacturer's family wherever possible while ensuring aesthetic, quality and functionality are not compromised. For example: Steelcase, Turnstone, Brayton International, Metro, and Vecta are all Steelcase companies. Each alternate should also be specified from a manufacturer's family of furniture, example: first set of alternates would be specified from Knoll's family of furniture

and the second from Herman Miller family of furniture. Select office furniture including case goods, tables, storage, seating, etc. that is compatible in style, finish and color.

It is acceptable to make selections from other than a manufacturer's family of furniture when costs are not reasonable for particular items, items are not available or appropriate for the facility, or the items are not on GSA Schedule. If this occurs, consider specifying product from an open line that is accessible by numerous dealerships.

See paragraph 1.3.2, j. for alternate manufacturer requirements.

1. 2. FORMAT AND SUBMITTAL REQUIREMENTS

The design package shall be provided in 8 1/2" x 11" format using three-ring binders with pockets on the inside of the cover. Project binder cover and spine inserts sheets identifying the document as "Furniture, Fixtures & Equipment" package and include the project name and location, Contractor/AE name and phone number(s), submittal phase and date. All text documents shall include a footer that lists the project name, location, date and submittal phase. Reference paragraph 1.3.4 for FF&E color board requirements. Use more than one binder when there are numerous pages with thick samples. Large D-ring binders are preferred to O-ring binders. Color board material shall be strong enough to keep pages from tearing out. Anchor large or heavy samples with mechanical fasteners or Velcro rather than rubber cement or glue. Fold out items must have a maximum spread of 17". Drawings shall be produced in an 11" x 17" format size and folded in an accordian style fold so that when it is folded in, it matches 8.5"xll" pages.

Reference Section 01 33 16, paragraph 3.9.1 for the number of copies required.

1.2.1 Interim Submittal shall include:

A. Design Narrative
B. Product Data Sheet, including data sheets for basis of design and all alternates
C. Drawings - Composite Furniture, Area Plans and Workstation Typicals
D. Color Boards
E. Cost Estimate
F. Portable Fire Extinguisher Data

1.2.2 Final Submittal

Provide a final FF&E package that includes any changes made as a result of interim review comments. Submittal shall include:

A. Design Narrative
B. Product Data Sheet, including data sheets for basis of design and all alternates
C. Drawings - Composite Furniture, Area Plans, Workstation Typicals and Electrical and Communication Plans

D. Color Boards
E. Cost Estimate
F. Portable Fire Extinguisher Data

1.2.3 Design Complete Submittal

Provide a complete submittal that includes any changes made as a result of final review comments. Documents shall be provided upon completion of the final architectural submittal or ten months prior to the contract completion date (whichever comes first), to ensure adequate time for furniture acquisition. Submittal shall include:

A. Design Narrative
B. Product Data Sheet, including data sheets for basis of design and all alternates
C. Drawings - Composite Furniture, Area Plans, Workstation Typicals and Electrical and Communication Plans
D. Color Boards
E. Cost Estimate
F. Portable Fire Extinguisher Data

One of the Installation's copies shall include the following for HNC furniture purchase:

A. Disc 1: Drawings in the latest version of AutoCAD (preferably dwg file format). Provide all files, including any reference files needed to view complete drawings.
B. Disc 2:
    1) All documents in PDF format including 11" x 17" drawings. Color boards are not required.
    2) Excel file of the cost estimate
C. Binder with paper copies of all FF&E components. Include binder cover and spine inserts with project information. Physical samples are not required. Provide high resolution images in a digital format of the color boards.

1. 3. SUBMITTAL COMPONENTS

All FF&E items shall be individually coded. This code shall be used and cross-referenced to all components of the FF&E.

1.3.1 Narrative of Interior Design Objectives

Provide a narrative description of the furniture, to include functional, quality, safety and ergonomic considerations, durability, sustainability, aesthetics, and compatibility with the building design. The narrative shall include the name and contact information for the DOR.

1.3.2 Product Data Sheet

Prepare one Product Data Sheet for each item specified in the design including typical workstations. This form identifies all information required to order each individual item. The product data sheet form must include:

A. Item Code (example: Cl, Tl, etc.)
B. Item Name (example: desk chair, training table, etc.)
C. Manufacturer
D. Design Series
E. Model Number
F. GSA Information (FSC Group, contract number, expiration date)
G. Overall Dimensions
H. Finishes:
    1) Paint color, wood species and finish, plastic laminate, etc. In addition to the manufacturer's furniture wood finish information that is provided, the DOR shall provide the manufacturer name, pattern name and manufacturer's identification number of a wood-patterned plastic laminate which can be used as a reference control sample for bidding purposes on all items that require wood components or veneer.
    2) Fabric name, number, and minimum Wyzenbeek Abrasion Test double rubs (code to fabric samples). Upholstery shall not be proprietary to one furniture manufacturer, but accessible by multiple furniture manufacturers. Non-proprietary fabric includes, but is not limited to, textile manufacturer's fabrics that have been graded into furniture manufacturer's fabric grades and are available through a manufacturer's GSA Schedule.
I. Quantity and Location:
    1) Item location by room number and room name
    2) Total quantity
J. Alternate Manufacturers.

Provide two (2) alternates for the major items that include but are not limited to, desks, wood casegoods, furniture systems, seating, and tables. Supply alternates that are available on GSA Schedule and meet the requirements of the product data sheet. Provide manufacturer name, product series and model number for each alternate manufacturer.

K. Furniture Item Illustration
L. Product Description:

Provide non-proprietary, project specific salient characteristics for the item specified. In general, this should include, but is not limited to:

    1) Functional features
    2) Style (aesthetics): narrative description of the item's appearance
    3) Sustainable design attributes
    4) Construction: construction materials and methods that relate to minimum quality standards required
    5) Testing requirements: BIFMA, etc. and weight limit for all chairs
    6) Ergonomic features and ranges
    7) Minimum warranty
    8) List any critical dimensions to include any maximum/minimum dimensions

M. Special instructions for procurement ordering and/or installation (if applicable)

1.3.2.1 Furniture Systems Requirements

For projects with furniture systems also provide the following minimum requirements:

A. Type of furniture systems (panel, stacking panels, spine wall, desk based system, or a combination)
B. Minimum panel noise reduction coefficient (NRC), if applicable
C. Minimum panel sound transfer coefficient (STC), if applicable
D. Minimum flame spread and smoke development
E. UL testing for task lighting and electrical system
F. Panel widths and heights and their locations (this may be done on the drawings)
G. Worksurface types and sizes (this may be done on the drawings)
H. Type of storage components (lateral files, pedestals, overhead storage, shelving, tower storage, etc.)
I. Worksurface edge type
J. Varying panel/cover finish materials and locations (locations may be shown on the drawings)
K. Keyboard requirements
L. Lock and keying requirements
M. Accessory components (examples: tack boards, marker boards, monitor arms, paper management, task lighting)
N. Electrical and communication raceway requirement; type, capacity and location (base, beltline, below and/or above beltline)
0. Locations of communication cables (base, beltline, below and/or above beltline, top channel)
P. Types of electrical outlets required; including dedicated circuits
Q. Types of communication jacks (provided and installed by others)
R. Locations of electrical outlets and communication jacks (this may be done on the drawings)
S. Type of cable (examples: Cat. 6 (UTP and STP), fiber optic, etc.) system needs to support (provided and installed by others)

1.3.3. Drawings

All drawings required as part of the FF&E interior design shall coordinate with the generic furniture floor plans provided and approved as part of the project construction drawings. Any changes in size, quantity, or location of FF&E items during the FF&E design, from that shown on the construction drawing generic furniture plans, must be reflected in the construction drawings.

Do not provide manufacturer specific information such as product names and numbers on drawings, Drawings shall be non-proprietary.

The drawings shall accurately reflect the proposed space planning and location of all FF&E items. Space planning shall incorporate all applicable

life safety codes and ABA/ADA requirements based on building type and utilization.

Although not included or specified as part of the FF&E design package, the plans shall show and identify the location and approximate sizes for all Mission Unique (MUE) furnished equipment that will occupy floor space. This includes but is not limited to such items as photocopiers, printers, vending machines, kitchen equipment, etc. MUE FF&E shall be clearly labeled on the drawings.

Drawings must include, but are not limited to the following:

A. Composite Furniture Plans. Scaled drawings shall indicate location of all furniture and equipment to clearly illustrate overall space planning concept and intent.
B. Area Furniture Plans. Scaled drawings (minimum 1/8" = 1'-0" recommended) showing detailed placement for each furniture, equipment, or accessory item. Provide key plan identifying area in which the building is located.
    1) All FF&E items shall be identified by code on the area plan. Each sheet shall include a legend listing all item codes and names.
    2) Provide critical dimensions to include open office area aisle widths, workstation spline wall centerline dimension to building walls, etc.
    3) Identify all mission unique equipment by item code or as not in contract (NIC). In addition, identify construction contractor provided equipment that has a significant footprint that will influence the location and arrangement of the FF&E furnishings items specified for this project.
C. Workstation Typical Plans. Large scaled plans and elevations/isometrics (minimum 1/2" = 1'-0") showing workstation typical configurations which clearly identify major workstation components to include but not be limited to panels, storage, worksurfaces, accessories (monitor arms, keyboard trays, etc.), and task lighting. Include location of all electrical and communication outlets, indicate height on panel by note or symbol.
D. Electrical and Communication Plans. In order to facilitate and coordinate connectivity to the FF&E, the drawing set shall also include copies of the building electrical and communications plans from the construction drawing set.

1.3.4 Color Boards

Color boards, which accurately reflect the furniture finishes, patterns, and colors selected for the project is required for the FF&E design. Provide samples of all finishes indicated on the Product Data Sheet for each FF&E item.

Samples shall be of sufficient size to adequately portray the pattern, color, and texture of the material. Photographic reproductions are prohibited. All samples shall be labeled and cross-referenced to the furniture plans and

Product Data Sheet. Recommend that furniture finishes be arranged and grouped on the color boards corresponding to rooms or areas (the reviewer shall be able to clearly and easily evaluate the coordination of interior building finishes and FF&E colors and patterns within each facility space or room). Color boards shall include, but are not limited to, paint, plastic laminate, fabric, wood finish (include reference control sample), etc.

1.3.5 Cost Estimate

Cost estimate should be based on GSA Schedules and organized by item code and name. The cost estimate must include separate line items for general contingency, installation, freight charges and any other related costs.

Installation and freight quotes from vendors should be used in lieu of a percentage allowance when available. An estimate developed by a furniture dealership may be provided as support information for the estimate, but must be separate from the DOR developed spreadsheet estimate.

1.3.5.1 Verification of Quantity

The DOR shall ensure that quantity counts for each item matches between the product data sheet, plans and cost estimate.

1.3.5.2 Signature Block

Include a written statement at the bottom of the cost estimate that states all pricing is based on GSA Schedules. Provide a line for a government POC signature.

1.3.5.3 Portable Fire Extinguishers

Fire extinguishers shall not be part of the FF&E package and be included and provided as part of construction.

1.4 FURNITURE SPECIFICATIONS

All furnishings must follow Army ACP Standard Design.

1.4.1 Construction

1.4.1.1. Modesty or back panel supports on freestanding desk/workstation components located against walls shall be specified as a fixed 1/2 or 1/3 partial height panel, or a hinged panel. Fixed panel heights shall be coordinated with the electrical and data outlet mounting heights shown on the construction drawings to provide direct access to these outlets.

1.4.1.2. Unless otherwise noted, provide lockable desks and workstations, filing cabinets and storage. Key all locks within a one person office the same; key all one person offices within a building differently. If an office or open office area has more than one workstation, key all the workstations differently, but key all locks within an individual workstation the same.

1.4.1.3. Use light-emitting diode (LED)/solid state lighting where task lighting is required in furniture.

1.4.2 Finishes and Upholstery

1.4.2.1. Keep placement of furniture systems panel fabric accent colors to a minimum.

1.4.2.2. Specify seating upholstery that meets Wyzenbeek Abrasion Test, 50,000 minimum rubs. Specify upholstery and finish colors and patterns that help hide soiling.

1.4.3 Sustainability

For all designs provided regardless of facility type, make every effort to implement all aspects of sustainability to the greatest extent possible for all selections made in the FF&E package.

1.4.4 Furniture Systems

Minimize the number of different workstation types and layouts including parts and pieces required to assist in future reconfiguration and inventorying.

1.4.5 Seating

1.4.5.1. Specify appropriate chair casters and glides in coordination with the floor finish where the seating is located.

1.4.5.2. All task seating shall support up to a minimum of 300 lbs.

1.4.5.3. Select ergonomic task chairs with casters, waterfall front, swivel, tilt, variable back lock, adjustable back height or adjustable lumbar support, pneumatic seat height adjustment, seat depth adjustment, 7-11" arm height adjustment above the seat, and mesh or upholstered seat that is padded and contoured with mesh or upholstered back. All desk chairs shall have an adjustable seat height range of 4 1/2", range to include 16 1/2-20". Task chair shall be rates 24/7 use. Task chairs only have arms at workstations and offices. Task chairs used at other locations are to be aimless.

1.4.5.4. In heavy use lounge, waiting and reception areas provide seating with arms that are non- upholstered or upholstered with wood arm caps.

1.4.6 Training Tables

Training tables shall be reconfigurable, moveable and storable. Specify power and data requirements, dollies, flip-top and modesty panels.

1.5. FURNITURE WARRANTIES.

Specify manufacturer's performance guarantees or warranties that include parts, labor and transportation as follows:

Furniture System, unless otherwise noted - 10 year minimum Furniture System

Task Lights - 2 year minimum, excluding bulbs

Furniture System Fabric -3 year minimum

Metal Desks - 12 year minimum

Seating, unless otherwise noted - 10 year minimum Ergonomic Task Seating 24/7 - 10 year minimum Seating

Mechanisms and Pneumatic Cylinders - 10 years

Ergonomic Task Seating Fabric (includes 24/7 seating) - 5 years minimum

Tables, unless otherwise noted - 10 year minimum Table Mechanisms - 5 year minimum

Table Ganging Device - 1 year minimum

Wood Casegoods, Files and Storage - 10 year minimum

Wood Framed Seating -10 year minimum Wood Seating Fabric - 3 years minimum Items not listed above - 1 year minimum

ATTACHMENT C
TRACKING CO:MMENTS IN DRCHECKS

1.0 General

The Government and DB Contractor shall set up the project in Dr Checks. Throughout the design process, the parties shall enter, track, and back-check comments using the DrChecks system.

Government and Contractor reviewers enter design review comments into DrChecks. Designers of Record shall annotate comments timely and specifically to indicate for the review conference exactly what action will be taken or why the action is not required. After the design review conference and prior to the next design submittal, the DOR's will annotate those comments that require DOR action, design revision, etc. to show how and where it has been addressed in the design documents, This shall be part of the required design configuration management plan. Comments considered critical by the conference participants shall be flagged as such.

2.0 DrChecks Review Comments

The Contractor and the Government shall monitor DrChecks to assure all comments are annotated and resolved prior to the next submittal. Print and include the DrChecks comments and responses and included in the design analysis for record in the next design submittal.

2.1. Upon review of comments prior to the design review conference, the DOR(s) shall identify whether they concur, non-concur, mark it "for information onlyn or mark it "check and resolven. Indicate exactly what action will be taken or why the action is not required.

2.2. Conference participants (reviewers) will expect coordination between Design Analysis calculations and the submitted design. Reviewers will also focus on the design submittal's satisfaction of the contract requirements.

2.3. After the conference, the DOR(s) shall formally respond to each applicable comment in DrChecks a second time prior to the next submittal, clearly indicating what action was taken and what drawing/spec/design analysis changed. Designers of Record are encouraged to directly contact reviewers to discuss and agree to the formal comment responses rather than relying only on DrChecks and review meetings to discuss comments. With the next submittal, reviewers will back-check answers to the comments against the new submittal, in addition to reviewing additional design work.

2.4. Clearly annotate in DrChecks those comments that, in the DB Contractor's opinion, require effort outside the scope of the contract. Do not proceed with work outside the contract until a modification to the contract is properly executed if one is necessary.

3.0 DrChecks Initial Account Set-Up

To initialize an office's use of DrChecks, choose a contact person within the office to call the DrChecks Help Desk at 800-428-HELP, M-F, 8AM-5PM, Central

time. This POC will be given an office password to distribute to others in the office. Individuals can then go to the hyperlink at http://www.projnet.org and register as a first time user. Upon registration, each user will be given a personal password to the DrChecks system.

3.1. Once the office and individuals are registered, the Contractor shall complete and submit a ProjNet New User Form for each individual to the USACE PM. The form is attached at the end. The USACE PM will assign the individuals and/or offices to the specific project for review. Once assigned, users may enter comments, respond to comments, and close comments, depending on their particular assignment.

4.0 DrChecks Reviewer Role

The Contractor is the technical reviewer, and the Government is the compliance reviewer of the DB's design documents. Each reviewer enters their own comments into the Dr Checks system. To enter comments:

4.1. Log into DrChecks.

4.2. Click on the appropriate project.

4.3. Click on the appropriate review conference. An Add comment screen will appear.

4.4. Select or fill out the appropriate sections (particularly comment discipline and type of document for sorting) of the comment form and enter the comment in the space provided.

4.5. Click the Add Comment button. The comment will be added to the database, and a fresh screen will appear for the next comment you have.

4.6. Once comments are all entered, exit DrChecks by choosing "My Account" and then Logout.

5.0 DrChecks Comment Evaluation (Step 1 of 2)

The role of the DOR(s) is to evaluate and respond to the comments entered by the Government's and DB Contractor's reviewers. To respond to comments:

5.1. Log into DrChecks.

5.2. Click on the appropriate project.

5.3. Under "Evaluate" click on the number under "Pending".

5.4. Locate the comments that require your evaluation. (Note: If you know the comment number you can use the Quick Pick window on your home page in DrChecks; enter the number and click on go.)

5.5. Select the appropriate evaluation radio button (concur, non-concur, for information only, or check and resolve) and respond with a brief explanation in the Discussion field. An explanation other than to say "concur" is not necessary for "Concur", but may be useful for the Design Configuration Management purposes.

5.6. Click on the Add button. The evaluation will be added to the database, and a fresh screen will appear with the next comment.

5.7. Once evaluations are all entered, exit DrChecks by choosing "My Account" and then Logout.

6.0 DrChecks Comment Evaluation (Step 2 of 2)

This is where the DOR(s) respond to each applicable comment in DrChecks after the design review conference, prior to the next submittal, clearly indicating what action was taken and what drawing/spec/design analysis changed. Respond to the previous comments, following the same steps as above, adding the narrative in the discussion field.

7.0 DrChecks Back-Check

At the following design conference, (where applicable) or at some other agreed time, Government and Contractor reviewers will back-check comment annotations against newly presented documents to verify that the designers' responses are acceptable and that all revisions have been completed.

Reviewers shall either enter additional back-check comments, if necessary, or close those where actions are complete.

7.1. Log into DrChecks.

7.2. Click on the appropriate project.

7.3. Under "My Backcheck" click on the number under "Pending".

7.4. If you agree with the designer's response select "Close Comment" and add a closing response if desired.

7.5. If you do not agree with the designer's response or the submittal does not reflect the response given, select "Issue Open", enter additional information.

7.6. Click on the Add button. The back-check will be added to the database, and a fresh screen will appear with the next comment.

7.7. Once back-checks are all entered, exit DrChecks by choosing "My Account" and then Logout. The design is completed and final when there are no pending comments to be evaluated and there are no pending or open comments under back-check.

ADD NEW USER REQUEST					
Site: (req)					
Office: (req)					
First name (req)					
Last name (req)					
Email (req)					
Phone (req)					
Street (opt)					
P.O. Box (opt)					
Org symbol (opt)					
City (opt)					
State/Province (opt)					
Postal Code (opt)					
Telefax (opt)					
Time Zone (req)					
Send Notification Email to User (req)		Yes		No	

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SECTION 01 33 29

SUSTAINABILITY REQUIREMENTS AND REPORTING
02/21, CHG 1: 08/25

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. For references without a year, use the current published version.

COUNCIL ON ENVIRONMENTAL QUALITY (CEQ) (WHITE HOUSE)

HPSB Guiding Principles	Guiding Principles for Sustainable Federal Buildings and Determining Compliance with the Guiding Principles for Sustainable Federal Buildings

INTERNATIONAL CODE COUNCIL (ICC)

ICC IgCC	(2018) International Green Construction Code

U.S. DEPARTMENT OF AGRICULTURE (USDA)

FSRIA 9002	Farm Security and Rural Investment Act Section 9002 (USDA BioPreferred Program)

U.S. DEPARTMENT OF DEFENSE (DOD)

UFC 1-200-02	(2020; Change 3, 2025) High Performance and Sustainable Building Requirements
UFC 3-410-01	(2025) Heating, Ventilating, and Air Conditioning Systems
UFC 3-600-01	(2016; with Change 6, 2021) Fire Protection Engineering for Facilities

U.S. DEPARTMENT OF ENERGY (DOE)

Energy Star	Energy Star Energy Efficiency Labeling System (FEMP)
FEMP	Federal Energy Management Program (FEMP) Energy-Efficient Product Procurement

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 247	Comprehensive Procurement Guideline for Products Containing Recovered Materials

1.2 SUMMARY

This section includes requirements for Sustainability documentation and

reporting submittals per the federally mandated High Performance and Sustainable Building (HPSB) or HPSB "Guiding Principles" (GP), in accordance with UFC 1-200-02 High Performance and Sustainable Building Requirements, and other identified requirements.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Preliminary High Performance and Sustainable Building Checklist; G

Sustainability Action Plan; G

Preliminary Sustainability eNotebook; G

SD-05 Design Data

Interim Design High Performance and Sustainable Building Checklist; G

Interim Design Sustainability eNotebook; G

Final Design High Performance and Sustainable Building Checklist; G

Final Design Sustainability eNotebook; G

SD-06 Test Reports

Third-Party Certification Design Compliance Report; G

SD-11 Closeout Submittals

Final High Performance and Sustainable Building Checklist; G

Final Sustainability eNotebook; G

Amended Final Sustainability eNotebook; G

Amended Final High Performance and Sustainable Building Checklist; G

1.4 GUIDING PRINCIPLES VALIDATION (GPV)

Guiding Principles Validation (GPV) is the project delivery team's self-assessment of UFC 1-200-02 compliance requirements, which includes meeting Federally-required tracking and reporting requirements, in order to report a sustainable Federal building. The use of a third-party certification is an additional and separate requirement.

Provide the following sustainability activities and documentation to verify achievement of HPSB Guiding Principles Validation (GPV):

a. Analysis of each Guiding Principle Requirement and how project complies. Include final government approved narrative(s) in the HPSB Checklist submittal. Multiple checklists indicate multiple buildings that require individual HPSB Checklist tracking.

b. No changes to the HPSB Checklist are allowed without approval from the Contracting Officer, in accordance with Section 01 33 00 SUBMITTAL REQUIREMENTS. Immediately bring to the attention of the Contracting Officer any project changes that impact meeting the approved HPSB Guiding Principles Requirements for this project. Demonstrate the change will not increase the life-cycle cost and maintains or improves the building performance.

c. Documentation of all work required to incorporate the applicable HPSB Guiding Principles requirements indicated on the HPSB Checklist and in this contract, including all "8" submittals.

d. Sustainability Action Plan.

e. Design and construction related documentation for the project Sustainability eNotebook and keep updated with regularly-scheduled Construction Quality Control Meetings. Include design and construction related documentation containing the following components:

(1) HPSB Checklist(s)

(2) Sustainability Action Plan

(3) Documentation illustrating HPSB Guiding Principles Requirements compliance, including "G" submittals

1.4.1 Sustainability Action Plan

Include the following information in the Sustainability Action Plan:

a. Analysis of each HPSB Guiding Principles Requirement and how project will comply. Final government approved narrative(s) must be included in the HPSB Checklist submittal.

b. Name and contact information for: Contractor's Point of Contact (POC) ensuring sustainability goals are accomplished and documentation is assembled. For TPC that include on-site visit by third party representative, provide list of required attendees.

c. Indoor Air Quality plan.

1.4.2 Calculations

Provide all design data, calculations, product data, labels and product certifications required in this specification to demonstrate compliance with the HPSB Guiding Principles Requirements.

1.5 SUSTAINABILITY SUBMITTALS

Provide HPSB Checklist and other documentation in the Sustainability eNotebook to indicate compliance with the sustainability requirements of the project.

1.5.1 High Performance Sustainable Building (HPSB) Checklist

Provide construction documentation that provides proof of, and supports compliance with, the completed HPSB Checklist.

1.5.1.1 HPSB Checklist Submittals

Submit updated HPSB Checklist with each Sustainability eNotebook submittal. Include the final HPSB Checklist(s) with the interim DD1354 Real Property Record Submittal.

1.5.2 [11]8[11] Submittals for Sustainability Documentation

[11]8[11] submittals are the sustainability documentation requirements cited in the various sections of this contract. Submit the GPV sustainability documentation required in this section as [11]8[11] submittals in all affected UFGS Sections.

a. Highlight GPV compliance data in [11]8[11] submittal.

b. Add [11]8[11] submittals to the Sustainability eNotebook only after submittal approval, and bookmark them as required in paragraph SUSTAINABILITY ENOTEBOOK below.

c. Ensure all approved "G" submittals are included in each Sustainability eNotebook submittal.

1.5.3 Sustainability eNotebook

The Sustainability eNotebook is an electronic organizational file that serves as a repository for all required sustainability submittals. To support documentation of compliance with an approved HPSB checklist, provide and maintain a comprehensive and current Sustainability eNotebook. Include all required data in Sustainability eNotebook, to support full compliance with the HPSB Guiding Principles Requirements, including:

a. HPSB checklist

b. Sustainability Action Plan

c. Calculations

d. Labels

e. [11]8[11] submittals

f. Certifications, assessments, or validations and compliance report

g. TPC documentation required in paragraph THIRD-PARTY CERTIFICATION (TPC).

1.5.3.1 Sustainability eNotebook Format

Provide Sustainability eNotebook in the form of an Adobe PDF file; bookmark each HPSB Guiding Principles Requirement and sub-bookmark at each document. Match format to HPSB Guiding Principles numbering system indicated herein. Maintain up-to-date information, such as spreadsheets, templates, with each current submittals.

Contracting Officer may deduct from the monthly progress payment

accordingly if Sustainability eNotebook information is not current and on track per project goals.

1.5.3.2 Sustainability eNotebook Submittal Schedule

Provide Sustainability eNotebook Submittals at the following milestones of the project:

a. Preliminary Sustainability eNotebook

b. Submit preliminary Sustainability eNotebook with updated Preliminary High Performance and Sustainable Building Checklist at the first post award meeting in accordance with Section 01 30 00 ADMINISTRATIVE REQUIREMENTS.

c. Interim Design Sustainability eNotebook

d. Submit updated Sustainability eNotebook with updated Interim Design High Performance and Sustainable Building Checklist, in accordance with Section 01 33 16.10 DESIGN DATA (DESIGN AFTER AWARD). If issues relating to achieving the sustainability goals of the project are subsequently identified, identify reasons and mitigation from DOR, and resubmit to the Contracting Officer for approval.

e. Final Design Sustainability eNotebook

f. Submit updated Sustainability eNotebook with updated Final Design High Performance and Sustainable Building Checklistwith the final design. If issues relating to achieving the sustainability goals of the project are subsequently identified, identify reasons and mitigation from DOR, and resubmit to the Contracting Officer for approval.

g. Third-Party Certification Design Compliance Report

h. Obtain Third-Party Certification Design Compliance Report after final design submittal is approved. Submittal must indicate 100 percent compliance with applicable design requirements. File approved submittal in the Sustainability eNotebook.

i. Construction Quality Control Meetings.

j. Provide up-to-date GP documentation in the Sustainability eNotebook for each meeting.

k. Final Sustainability eNotebook

1. Submit updated Sustainability eNotebook with updated Final High Performance and Sustainable Building Checklist at Beneficial Occupancy Date (BOD). Final progress payment retainage may be held by Contracting Officer until Final Sustainability construction phase documentation is complete.

m. Amended Final Sustainability eNotebook

n. Amend and resubmit the Amended Final Sustainability eNotebook with Amended Final High Performance and Sustainable Building Checklist, to include post-occupancy corrections, updates, and requirements. Final progress payment retainage may be held by Contracting Officer until amended final sustainability documentation is complete. Submit

electronic copy of the Amended Final Sustainability eNotebook Submittal to the Contracting Officer no later than 30 days after final GP determination.

1.6 DOCUMENTATION REQUIREMENTS

a. Incorporate each of the following HPSB Guiding Principles requirements into project and provide documentation that proves compliance with each listed requirement. Items below are organized by HPSB Guiding Principles. For life-cycle cost analysis requirements, one document with all analyses is acceptable, with Contracting Officer approval.

b. For each of the following paragraphs that require the use of products listed on Government-required websites, provide documentation of the process used to select products, or process used to determine why listed products do not meet project performance requirements.

1.6.1 Integrated Design Process

For the submittal documentation below, demonstrate compliance with UFC 1-200-02.

1.6.1.1 Design Submittal Documentation

a. List the sustainability integrated design team, and a description of their roles in all stages of a project's planning and delivery:

(1) Include Contractor's Sustainability Coordinators; Architecture and Engineering disciplines involved on the project, and the DOR in charge of the overall project and each discipline; Construction Subcontractors and the company representatives that align with each architectural and engineering discipline, Planning, Public Works, Environmental Specialist and other appropriate installation personnel.

(2) Describe their roles and responsibilities and plan-of-action for how each team member will be involved to achieve the project sustainability requirements, and how the Contractor will coordinate with Government personnel.

(3) Maintain an up-to-date list with descriptions throughout the project.

b. Provide narratives that:

(1) Indicate each performance goal cited in UFC 1-200-02 paragraph "Integrated Design Process", along with other comprehensive design goals and ensures incorporation and integration of these goals throughout the planning, design, construction, and life cycle of the building..

(2) Demonstrate integration of the goals into design and construction.

(3) Demonstrate collaboration with other providers, such as Commissioning Provider.

1.6.2 Commissioning (Cx)

Develop and incorporate Commissioning requirements into the documents, and provide final commissioning report. Refer to Section 01 91 00.15 BUILDING COMMISSIONING and related documents for commissioning requirements.

1.6.3 Optimize Energy Performance

For the submittal documentation below, demonstrate compliance with UFC 1-200-02.

1.6.3.1 Design Submittal Documentation

a. Narrative that provides a summary of:

(1) The decision-making process for considering and implementing passive strategies prior to designing active and mechanical systems.

(2) The decision-making process leading to the selection of at least three energy-efficient solutions (for each system contributing to the energy footprint of the building) to be analyzed; and the selected design solution(s)

(3) The specific energy standard and version utilized; and the software used in the analysis

(4) The calculated energy consumption and energy use intensity (EUI in kBTU/sf/yr) of the baseline building and the proposed design alternatives

b. A minimum of the following energy modeling files and summaries for the baseline and proposed alternatives:

(1) Input, schedules and libraries; and output

(2) Calculated energy use by energy type

(3) Calculated energy use by building system

c. The life-cycle cost analysis input and output files for the baseline and the proposed alternatives

1.6.3.2 Construction Submittal Documentation

Provide revised energy modeling for actual system constructed.

1.6.4 Energy Efficient Products

Provide only energy-using products that are Energy Star Certified by the Environmental Protection Agency (EPA) or that meet or exceed the efficiency standard designated by the Federal Energy Management Program (FEMP). Where Energy Star or FEMP requirements have not been established, provide most efficient products that are life-cycle cost-effective. Provide only energy using products that meet FEMP requirements for low standby power consumption. Energy efficient products can be found at: https://www.energystar.gov/.

For construction submittal documentation, provide proof that product is

labeled energy efficient and complies with the cited requirements.

1.6.5 On-Site Renewable Energy Generation

For the submittal documentation below, demonstrate compliance with UFC 1-200-02.

1.6.5.1 Design Submittal Documentation

Provide life-cycle cost analysis (LCCA) When found to be LCCE, do one of the following options:

a. Provide design drawings and calculations that demonstrate total on-site renewable energy as an annual percentage of proposed building energy consumption in kBTU/year; and provide equipment ratings, and calculations that demonstrate the generation capacity of the system in kBTU/year for thermal and kwh for electricity.

b. Provide documentation that renewable energy development at the Installation level is planned.

1.6.6 Solar Domestic Hot Water (SDHW)

For the submittal documentation below, demonstrate compliance with UFC 1-200-02.

1.6.6.1 Design Submittal Documentation

Provide life-cycle cost analysis (LCCA) When found to be LCCE, provide design drawings and calculations that demonstrate total on-site renewable energy as an annual percentage of proposed building energy consumption in kBTU/year; and provide equipment ratings, and calculations that demonstrate the generation capacity of the system in kBTU/year for thermal.

1.6.7 Building-level Power Metering

Provide building-level meters for electricity, natural gas, and steam where applicable.

1.6.7.1 Design Submittal Documentation

Provide design drawings that highlight meter locations on the site.

1.6.7.2 Construction Submittal Documentation

Provide documentation of meter communication with the base-wide meter monitoring system, and manufacturer's data validating compatibility with base-wide system and component advanced meter requirements.

1.6.8 Indoor Water Use

Provide Construction Documentation proof that fixtures are labeled EPA WaterSense, for products available with EPA WaterSense labeling; for **all** other fixtures, proof they comply with EPA WaterSense efficiency requirements.

1.6.9 Indoor Water Metering

Provide building-level meters for potable water use. Provide the

requirements cited in the following paragraphs:

1.6.9.1 Design Submittal Documentation

Provide design drawings that highlight meter locations on the site.

1.6.9.2 Construction Submittal Documentation

Provide documentation of meter communication with the base-wide meter monitoring system, and manufacturer's data validating compatibility with base-wide system and component advanced meter requirements.

1.6.10 Outdoor Water Use

When there is no permanent irrigation system beyond plant establishment period, this element is met.

1.6.10.1 Construction Submittal Documentation

Provide documentation of meter communication with the base-wide meter monitoring system, and manufacturer's data validating compatibility with base-wide system and component advanced meter requirements.

1.6.11 Outdoor Water Meters

Provide meters for outdoor systems that use potable water. requirements cited in the following paragraphs:

1.6.11.1 Design Submittal Documentation

a. Provide design drawings that highlight meter locations on the site.

b. Provide life-cycle cost analysis (LCCA).

1.6.11.2 Construction Submittal Documentation

Provide documentation of meter communication with the base-wide meter monitoring system, and manufacturer's data validating compatibility with base-wide system and component advanced meter requirements.

1.6.12 Alternative Water

Use alternative sources of water to replace potable water usage, when life-cycle cost-effective and to the extent permitted by local laws and regulations. Design Submittal Documentation

a. Provide design drawings and calculations that demonstrate the alternative water sources used, potable water savings as compared to non-alternative water sourcing, and projected annual potable water savings.

b. Provide life-cycle cost analysis (LCCA).

1.6.13 Stormwater Management

Develop and incorporate stormwater requirements into the documents. Service processes, as proof of this tracking requirement.

1.6.14 Ventilation and Thermal Comfort

For the submittal documentation below, demonstrate compliance with

UFC 1-200-02 and UFC 3-410-01.

1.6.14.1 Design Submittal Documentation

Provide design drawings and calculations that demonstrate HVAC systems and the building envelope have been designed to meet the requirements.

1.6.15 Daylighting

For the submittal documentation below, demonstrate compliance with UFC 1-200-02.

1.6.15.1 Design Submittal Documentation

a. Provide floor plans and elevations that demonstrates all required illumination levels, including automated and daylighting controls, and daylighting where people regularly occupy and gather.

b. Provide design analysis delineating requirements, to include compliant reflective surface locations and shading devices (where applicable).

1.6.16 Moisture Control

Provide the following:

1.6.16.1 Design Submittal Documentation

Provide drawings of building envelope details, HVAC humidity controls, and design calculations .

1.6.16.2 Construction Submittal Documentation

Ensure construction materials are separated and protected in accordance with other sections in this contract document, with adequate humidity controls during construction. In accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA, includes plan for ongoing building moisture control.

1.6.17 Reduce Volatile Organic Compounds (VOC) (Low-Emitting Materials) Meet the requirements of Table 3-1 at the end of this specification.

For Construction submittal documentation, provide certifications or labels that demonstrate compliance with cited requirements, based on the attached TABLE 3-1.

1.6.18 Indoor Air Quality During Construction

Prior to construction, create indoor air quality plan. Develop and implement an IAQ construction management plan during construction and flush building air before occupancy.

For new construction and for renovation of unoccupied existing buildings, meet the requirements of ICC IgCC 1001.3.1.5 (10.3.1.5) Indoor Air Quality (IAQ) Construction Management.

Provide documentation showing that after construction ends and prior to occupancy, HVAC filters were replaced and building and area air was flushed out in accordance with the cited standard.

1.6.19 Recycled Content

Comply with 40 CFR 247. Refer to: https://www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program for assistance identifying products cited in 40 CFR 247. Selected products must comply with non-proprietary requirements of the Federal Acquisition Regulation and must meet performance requirements.

1.6.19.1 Construction Submittal Documentation

a. Provide manufacturers' documents stating the recycled content by material, or written justification for claiming one of the exceptions allowed on the cited website.

b. Substitutions: Submit for Government approval for proposed alternative products or systems that provide equivalent performance and appearance and have greater contribution to project recycled content requirements. For all such proposed substitutions, submit with the Sustainability Action Plan accompanied by product data demonstrating equivalence.

c. In order to complete compliance with RFO 52.223-9 Estimate of Percentage of Recovered Material Content for EPA Designated Items, refer to submittal requirement for recycled/recovered material content in Section 01 78 00 CLOSEOUT SUBMITTALS.

1.6.20 Bio-Based Products

Provide products and materials composed of the highest percentage of bio-based materials (including rapidly renewable resources and certified sustainably harvested products), consistent with FSRIA 9002 USDA BioPreferred Program, to the maximum extent possible without jeopardizing the intended end use or detracting from the overall quality delivered to the end user and when available at a reasonable cost. Use only supplies and materials of a type and quality that conform to applicable specifications and standards.

Comply with FSRIA 9002 USDA BioPreferred Program. Refer to www.biopreferred.gov for the product categories and BioPreferred Catalog. Selected products must comply with non-proprietary requirements of the Federal Acquisition Regulation and must meet performance requirements. Provide the following documentation:

a. USDA BioPreferred label for each product; for bio-based products used on project but not listed with BioPreferred program, provide bio-based content and percentage.

b. In order to complete compliance with RFO 52.223-1 Biobased Product Certification, refer to submittal requirement for biobased products in Section 01 78 00 CLOSEOUT SUBMITTALS, paragraphs CERTIFICATION OF EPA DESIGNATED ITEMS and CERTIFICATION OF USDA DESIGNATED ITEMS.

1.6.21 Waste Material Management (Recycling - Design)

For the submittal documentation below, demonstrate compliance with UFC 1-200-02.

For design submittal documentation, provide drawing showing an appropriately sized and placed dedicated storage area for recyclables.

1.6.22 Waste Material Management (Recycling - Construction)

Divert demolition and construction debris in accordance with Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 SUSTAINABILITY COORDINATION

Provide sustainability focus and coordination at all meetings to achieve sustainability goals. Coordinate meeting requirements with other UFGS Sections meeting requirements in this project. Ensure the designated sustainability professional responsible for GP documentation participates in these meetings to coordinate documentation completion. Review GP sustainability requirements, HPSB Checklist documentation, Sustainability Action Plan, and completeness status of Sustainability eNotebook at the following meetings:

a. Pre-Construction Conference

b. Construction Quality Control Meetings

c. Refer to Section 01 30 00 ADMINISTRATIVE PROCEDURES for Post Award Meetings.

d. Post Award Meeting

e. Design Quality Assurance Meetings

f. Design Complete Review Meetings

g. Conduct review no later than 60 days after final design complete submission and identify any outstanding issues that affect correct completion of all documentation requirements, and actions that will achieve requirements. Conduct corrective actions.

h. TPC On-site Visit

i. Execute, coordinate, and facilitate on-site visit by third-party representative no later than 60 days before final turnover, or as required by TPC organization, whichever is greater.

j. Facility Turnover Meetings

k. Conduct review no later than 60 days before final turnover and identify any outstanding issues that affect correct completion of all documentation, and actions that will achieve requirements. Conduct corrective actions prior to turnover, to ensure all requirements are achieved.

3.2 TABLE 3-1 VOLATILE ORGANIC COMPOUNDS (VOC) (LOW EMITTING MATERIALS) REQUIREMENTS

TABLE 3-1 Volatile Organic Compounds (VOC) (Low Emitting Materials) Requirements

Source: ICC IgCC Chapter 8 (Materials) (Interior Applications Only)

MATERIAL CATEGORY	**EMISSIONS REQUIREMENT**		**MATERIALS WITH ADDED VOC REQUIREMENT**	**EMISSIONS REQUIREMENTS**
Adhesives and Sealants	**CDPH/EHLB/Standar, method V1.1 (California Section 01350)** (Use "office" or "classroom" space limits for all applications)	or	Adhesives (carpet, resilient, wood flooring; base cove; ceramic tile; drywall and panel; primers) Sealants (acoustical; firestop; HVAC Air duct; primers) Caulks	**SCAQMD Rule 1168** (Use "other" category for HVAC duct sealant) (for firestop adhesive, UFC 3-600-01 overrides conflicting requirements)
			Aerosol adhesives	**Section 3 of Green Seal Standard GS-36** (except: cleaners, solvent cements, and primers used with plastic piping and conduit in plumbing, fire suppression, and electrical systems; HVAC air duct sealants when the application space air temp is less than 40 F (4.5 C).

TABLE 3-1 Volatile Organic Compounds (VOC) (Low Emitting Materials) Requirements

Source: ICC IgCC Chapter 8 (Materials) (Interior Applications Only)

MATERIAL CATEGORY	EMISSIONS REQUIREMENT		MATERIALS WITH ADDED VOC REQUIREMENT	EMISSIONS REQUIREMENTS
Paints and Coatings	**CDPH/EHLB/Standard method V1.1 (California Section 01350)** (Use "office" or "classroom" space limits for all applications)	or	Flat and nonflat, nonflat high-gloss, specialty, basement specialty, fire-resistive, floor, low-solids, rust preventative, wood, reflective wall coatings; concrete/masonry sealers; primers; sealers; undercoaters; shellacs (clear and opaque); stains; varnishes; conjugated oil varnish; lacquer; clear brushing lacquer	**Green Seal Standard GS-11**

TABLE 3-1 Volatile Organic Compounds (VOC) (Low Emitting Materials) Requirements

Source: ICC IgCC Chapter 8 (Materials) (Interior Applications Only)

MATERIAL CATEGORY	EMISSIONS REQUIREMENT		MATERIALS WITH ADDED VOC REQUIREMENT	EMISSIONS REQUIREMENTS
Paints and Coatings	**CDPH/EHLB/Standa method V1.1 (California Section 01350)** (Use "office" or "classroom" space limits for all applications)	or	Concrete curing compounds; dry fog, faux finishing, graphic arts (sign paints), industrial maintenance, mastic texture, metallic pigmented, multicolor, recycled coatings; pretreatment wash primers, reactive penetrating sealers; specialty primers, wood preservatives, and zinc primers	**California Air Resources Board (CARB) Suggested Control Measure for Architectural Coatings** or **SCAQMD Rule 1113r**
Paints and Coatings	**CDPH/EHLB/Standa method V1.1 (California Section 01350)** (Use "office" or "classroom" space limits for all applications)	or	High-temperature coatings; stone consolidants; swimming-pool coatings; tub- and tile-refining coatings; and waterproofing membranes	**California Air Resources Board (CARB) Suggested Control Measure for Architectural Coatings**

TABLE 3-1 Volatile Organic Compounds (VOC) (Low Emitting Materials) Requirements Source: ICC IgCC Chapter 8 (Materials) (Interior Applications Only)				
MATERIAL CATEGORY	**EMISSIONS REQUIREMENT**		**MATERIALS WITH ADDED VOC REQUIREMENT**	**EMISSIONS REQUIREMENTS**
Floor Covering Materials	For carpet, all locations: **CDPH/EHLB/Standa Method V1.1 (California Section 01350)** or label for **Section 9** of **CDPH/EHLB/Standa Method V1.1 (California Section 01350)**		none	none
Insulation	**CDPH/EHLB/Standa method V1.1** (California Section 01350) (Use "office" or "classroom" space limits for all applications)		none	none

TABLE 3-1 Volatile Organic Compounds (VOC) (Low Emitting Materials) Requirements

Source: ICC IgCC Chapter 8 (Materials) (Interior Applications Only)

MATERIAL CATEGORY	EMISSIONS REQUIREMENT		MATERIALS WITH ADDED VOC REQUIREMENT	EMISSIONS REQUIREMENTS
Composite Wood, Wood Structural Panel, and Agrifiber Products, no added urea-formaldehyde resins including laminating adhesives for composite wood and agrifiber assemblies - particleboard, medium density fiberboard (MDF), wheatboard, strawboard, panel substrates, door cores	Third-party certification (approved by CARB) of **California Air Resource Board's (CARB) regulation** Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products	or	none	**CDPH/EHLB/Standa method V1.1** (California Section 01350) (Use "office" or "classroom" space limits for all applications) (except: Structural panel components such as plywood, particle board, wafer board, and oriented strand board identified as "EXPOSURE 1," "EXTERIOR," or "HUD-APPROVED" are considered
Office Furniture Systems and Seating installed prior to occupancy	**ANSI/BIFMA X7.1 ANSI/BIFMA X7.1:** (95-percent of installed office furniture system workstations and seating units) **Section 7.6.2 of ANSI/BIFMA e3** (50-percent of office furniture system workstations and seating units)		none	none

TABLE 3-1 Volatile Organic Compounds (VOC) (Low Emitting Materials) Requirements

Source: ICC IgCC Chapter 8 (Materials) (Interior Applications Only)

MATERIAL CATEGORY	EMISSIONS REQUIREMENT		MATERIALS WITH ADDED VOC REQUIREMENT	EMISSIONS REQUIREMENTS
Ceiling and Wall assemblies and systems including: acoustical treatments; ceiling panels and tiles; tackable wall panels and coverings; wall coverings; wall and ceiling paneling and planking	**CDPH/EHLB/Standard method V1.1 (California Section 01350)** (Use "office" or "classroom" space limits for all applications)		none	none

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SECTION 01 35 10.00 46

SPECIAL PROJECT PROCEDURES FOR PINE BLUFF ARSENAL

PART 1 GENERAL

This Section covers the project requirements unique to Pine Bluff Arsenal (PBA), Whitehall, Arkansas. These unique requirements relate to items such as the Installation Entrance, Emergency Services, Required Training, Photographs, and Controlled Areas.

1.1 INSTALLATION ENTRANCE REQUIREMENTS

All personnel accessing the PBA must have DOD affiliation or be vetted at the PBA Security Office and issued a pass before being allowed onto PBA. Contractor employees working at PBA will be issued an extended pass once they have been vetted.

1.1.1 Pine Bluff Arsenal Base Policies

a. All persons entering the base must present valid identification with REAL ID at the entrance.

b. While operating any vehicle on base, all drivers must have in their possession a valid driver's license, valid vehicle registration, and proof of vehicle insurance. If a vehicle is registered to someone other than the operator, the operator must provide a notarized letter from the registered owner, authorizing the operator permission to operate the vehicle. Only company owned vehicles with company logo may be allowed in certain, secure areas on base.

c. Access to the base may sometimes be delayed by 60 minutes or more due to security precautions, including the checking of vehicle occupants IDs, vehicle manifests, and the searching of all vehicles. Longer wait times may occur in the event of an emergency.

d. Contractors, Subcontractors, and all personnel who report for work and do not know the location of the project location/work site shall be held at the main gate to await escort service from the construction superintendent or other designated representative.

e. Base speed limits are strictly enforced with the use of radar equipment. The speed limit on base is 35 mph. The Contractor and all employees shall abide by all posted speed limits.

f. Motorcycle operators must have headlights always turned on. Passengers are not allowed on motorcycles unless the motorcycle is specifically designed to carry a passenger (determined by the manufacturer). Motorcycle operators/riders must wear headgear (helmets).

g. Mandatory seatbelt laws are in effect on base and personnel are not permitted to ride in the beds of trucks. Seatbelts must be fastened prior to entering the base.

h. No privately owned weapons or contraband (drugs, etc.) are permitted on any military installation, at any time. Violators

shall be prosecuted through the Federal Magistrates Court.

i. The Pine Bluff Arsenal is a closed facility. No unauthorized tours or visitors shall be allowed on the installation.

j. Cell phone usage while driving on base is not permitted unless communication to device is "hands free".

k. All personnel shall obey all posted directives and shall adhere to Security Forces directions and instructions.

1. Failure to comply with base policies may result in loss of driving privileges or debarment.

m. Deliveries are to be escorted by DoD ID'd individual.

1.1.2 Vetting Requirements

Entry Requirements for person without a Valid DOD ID Card requesting unescorted access:

- A valid purpose for entering the installation; (Attend Meeting, visit Museum, Job interview, etc.)
- State issued REAL ID
- Valid driver's license
- Current vehicle registration (If operating a vehicle)
- Proof of current insurance (If operating a vehicle)
- License plate number
- Provide the destination, name of facility, building number, street address, or unit name/designation

Upon satisfying the above criteria and vetting requirements an Installation access pass/badge will be issued to the person.

The Contractor is advised that additional security vetting requirements are applicable for foreign national personnel requiring access to Pine Bluff Arsenal (PBA). These requirements may involve extended processing and approval durations, which shall be accounted for in the project schedule. The Contractor shall be responsible for initiating and coordinating all required vetting procedures in a timely manner. Foreign national personnel shall be escorted at all times while on PBA property in accordance with site security protocols.

NOTE: All unescorted visitors and all vehicle passengers (riding in these vehicles) will proceed to the base Security Forces Center and receive a security screening. All vehicle occupant names will be included on an Installation Visitors Pass. Security personnel will verify all occupants ID with names on visitor passes at Installation Access Control Points (IACP) prior to providing installation access.

1.1.3 Pine Bluff Arsenal Emergency Services

When dialing "911" from a cellular phone, inform operator that the individual is calling from a cellular phone and that the emergency is at

Pine Bluff Arsenal. For non-emergency security business, 24 hours a day, 7 days a week, call (870) 540-3501/3/4/5.

1.1.4 Pine Bluff Arsenal Required Training

a. Prior to beginning construction, the Contractor must complete the course for OPSEC awareness for contractors. The course provides information on the basic need to protect unclassified information about operations and personal information. Contractor must provide proof of OPSEC if completed to the Contracting Officer.
b. Link below is for OPSEC training: https://jkodirect.jten.mil
c. The Contractor shall complete Security Education and Training Awareness (SETA) in accordance with DoDM5200.01V3 DAFMAN16-1404V3, Encl 5, Security Education and Training, Initial Orientation under Information Security Program. The PBA Security Forces/Pass and ID Section will provide this training. PBA Security Forces/Pass and ID's contact number: (870) 540-3481.
d. Antiterrorism Force Protection (ATFP) will be required for all workers to be conducted during safety indoctrination. A slideshow for this training will be provided to the Contractor by the Contracting Officer and PBA Security Forces.

1.2 PHOTOGRAPHS

a. Cameras are to be used for construction documentation only. Any photographs that need to be taken relative to the construction site must be coordinated with the COR or PM.
b. The Contractor must have an approved PBA Form 190-20 prior to taking any photographs of facilities and/or the base. The Contractor shall coordinate with the COR or PM, the PBA Post Photographer, and the PBA OPSEC Officer for approval of photographs prior to distribution. The photographer shall carry all letters of approval required to photograph a facility with them at all times while on site.

   Note: there will be times on certain contracts when photographs are not permitted.

c. All photographs produced by the Contractor under this contract, whether prints are produced from them or submitted against one of the requirements above, shall become property of the Government and shall be submitted to the Contracting Officer.

d. The Contractor shall maintain a file of all photographs produced for each construction contract and provide PDF versions of them to the Government upon completion of the construction contract.

e. Each photograph shall be numbered in a logical numbering system which is used to key photographic prints to the appropriate file. In taking photographs, the Contractor shall employ a device (such as a "data back" on the camera) to record date of the photographic shot on the film.

1.3 WORK-INCONTROLLED AREAS AND FREE ZONE REQUIREMENTS

a. This portions of this project may be located within Controlled Areas on base. Access to Control Areas is strictly limited.

b. The Contractor shall ensure that Contractor personnel employed on the base become familiar with and obey all special regulations for working in Controlled Areas.

c. Under no circumstances shall the Contractor, any subcontractors, or any contractor personnel enter Controlled Areas without a Government escort unless a Free Zone waiver is approved.

d. The Contractor shall remain strictly within the limits of work inside Controlled Areas.

a. The Contractor shall not take photographs inside of Controlled Areas without written authorization from the Contracting Officer. Individuals authorized to take photos should have a copy of the letter granting permission on their person at all times while taking pictures. Individuals taking photos without authorization or proof of authorization may be subject to legal action. Cameras and/or phones used to take unauthorized photos may be confiscated and any film, video, or other media destroyed by Security Forces. Contractor shall take pictures of the construction area prior to construction and at end of the construction period. Contractor shall invite Contracting Officer to be in attendance while taking pictures.

b. During construction, a Free Zone will be established at the construction site for all projects that are inside of or have portions inside of a Controlled Area. A Free Zone package identifies all the security measures that will be employed during construction to ensure protection of the Controlled Areas within the limits of the project.

c. The Government will supply all escorts required by the Free Zone package. The Contractor shall supply and maintain all barricades, markings, flags, signs, and other physical boundary markers as required by the Free Zone package at no additional cost to the Government.

d. An approved Free Zone is required before any work is accomplished on the airfield.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submittals with an "S" are for inclusion in the Sustainability Notebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

1.5 LANDSCAPING AND TREE REPLACEMENT

Landscaping and Tree Replacement Contractor shall consult with the PM and PBA Master Planner prior to removal of native hardwood trees greater than 3 inches in diameter.

1.6 POST CONSTRUCTION CLEANUP

The Contractor shall clean up all areas used for construction in accordance with Contract Clause: ''Cleaning Up". The Contractor shall, unless otherwise instructed in writing by the Contracting Officer, obliterate all signs of temporary construction facilities such as haul roads, work area, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other vestiges of construction prior to final acceptance of the work. The disturbed area shall be graded, filled and the entire area stabilized unless otherwise indicated.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

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SECTION 01 35 26

GOVERNMENTAL SAFETY REQUIREMENTS
05/24, CHG 1: 05/25

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)

ANSI/ASSP A10.34	(2021) Protection of the Public on or Adjacent to Construction Sites
ANSI/ASSP A10.44	(2020) Control of Energy Sources (Lockout/Tagout) for Construction and Demolition Operations

ASTM INTERNATIONAL (ASTM)

ASTM F855	(2020) Standard Specifications for Temporary Protective Grounds to Be Used on De-energized Electric Power Lines and Equipment

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 1048	(2016) Guide for Protective Grounding of Power Lines
IEEE C2	(2023) National Electrical Safety Code

INTERNATIONAL SAFETY EQUIPMENT ASSOCIATION (ISEA)

ANSI/ISEA Z89.1	(2014; R 2019) American National Standard for Industrial Head Protection

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 51B	(2024) Standard for Fire Prevention During Welding, Cutting, and Other Hot Work
NFPA 70	(2026; TIA 26-1; ERTA 26-1; TIA 26-2; TIA 26-3; TIA 26-4; TIA 26-5; TIA 26-6; TIA 26-7; ERTA 26-2; ERTA 26-3) National Electrical Code
NFPA 70E	(2024) Standard for Electrical Safety in the Workplace
NFPA 241	(2022; ERTA 22-1) Standard for Safeguarding Construction, Alteration, and Demolition Operations

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2024) Safety -- Safety and Occupational Health (SOH) Requirements

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

10 CFR 20	Standards for Protection Against Radiation
29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1915	Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment
29 CFR 1926	Safety and Health Regulations for Construction
49 CFR 173	Shippers - General Requirements for Shipments and Packagings
CPL 2.100	(1995) Application of the Permit-Required Confined Spaces (PRCS) Standards, 29 CFR 1910.146

1.2 DEFINITIONS

The following definitions are for the convenience of the reader. If there is a referenced document in the text of this specification section, that is the document that should define terms for that paragraph. If further clarification is needed, contact the Contracting Officer.

1.2.1 Site Safety and Health Officer (SSHO)

A Contractor Employee that is responsible for overseeing and ensuring implementation of the prime Contractor's Safety and Occupational Health (SOH) program according to the Contract, EM 385-1-1, applicable federal, state, and local requirements.

1.2.1.1 Level One SSHO

A designated employee with full-time SOH responsibility that meets and follows the requirements of EM 385-1-1.

1.2.1.2 Level Two SSHO

A designated employee with Level Two SSHO responsibility that meets and follows the requirements of EM 385-1-1. Level Two SSHOs cannot be assigned to projects that have a residual Risk Assessment Code (RAC) of high or extremely high.

1.2.1.3 Level Three SSHO

A designated Qualified Person or Competent Person with SOH responsibility that meets and follows the requirements of EM 385-1-1. Level 3 SSHOs cannot be assigned to projects that have a residual RAC of high or extremely high.

1.2.1.4 Alternate SSHO

An employee that meets the definition of the contract-required level SSHO, but is not the primary SSHO.

1.2.2 Competent Person (CP)

The CP is a person designated in writing, who, through training, knowledge and experience, is capable of identifying, evaluating, and addressing existing and predictable hazards in the working environment or working conditions that are unsanitary, hazardous, or dangerous to personnel, and who has authorization to take prompt corrective measures to eliminate them.

1.2.3 Qualified Person (QP)

The QP is a person designated in writing, who, by possession of a recognized degree, certificate, or professional standing, or extensive knowledge, training, and experience, has successfully demonstrated their ability to solve or resolve problems related to the subject matter, the work, or the project.

1.3 SUBMITTALS

Government Acceptance or Approval does not remove responsibility from the Contractors for their actions or liability.

Government approval is required for submittals with a "G" or "[11]8[11]" classification. Submittals not having a "G" or "[11]8[11]" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Accident Prevention Plan (APP) Design; G

Accident Prevention Plan (APP) Construction; G

SD-06 Test Reports

Accident Reports; G

LHE Inspection Reports

Monthly Exposure Reports; G

SD-07 Certificates

Activity Hazard Analysis (AHA); G

Certificate of Compliance

Hot Work Permit

License Certificates

Portable Gauge Operations Planning Worksheet; G

Radiography Operation Planning Work Sheet; G

Standard Lift Plan; G

Critical Lift Plan; G

1.4 PUBLIC HEALTH EMERGENCIES

In the event of a declared public health emergency, follow safety precautions as required by the Occupational Safety and Health Administration (OSHA) www.osha.gov, the Centers for Disease Control and Prevention (CDC) www.cdc.gov, and as required by federal, state and local requirements.

1.5 MONTHLY EXPOSURE REPORTS

Provide a Monthly Exposure Report by the fifth day of each month for the previous month. This report is a compilation of employee-hours worked each month for all site workers, both Prime and subcontractor. Failure to submit the report may result in retention of up to 10 percent of the progress payment. Submit the hours via the agency construction management system of record.

1.6 REGULATORY REQUIREMENTS

In addition to the detailed requirements included in the provisions of this Contract, comply with the most recent edition of USACE EM 385-1-1, and the following federal, state, and local laws, ordinances, criteria, rules and regulations at the date of the Solicitation for this Contract. Submit matters of interpretation of standards to the appropriate administrative agency for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements govern.

1.7 SITE QUALIFICATIONS, DUTIES, AND MEETINGS

1.7.1 Site Safety and Health Officer (SSHO)

1.7.1.1 Qualifications of SSHO

All SSHOs will have met the training, experience requirements identified in the EM 385-1-1 and this Contract.

1.7.1.2 Duties of SSHO

All SSHOs will carry out the roles and responsibilities as identified in this Contract and the EM 385-1-1. All SSHOs will be designated on an ENG Form 6282, provided by the Contracting Officer. Superintendent, QC Manager, and SSHO are subject to dismissal if their required duties are not being effectively carried out. If either the Superintendent, QC Manager, or SSHO are dismissed, project work will be stopped and will not be allowed to resume until a suitable replacement is approved and the above duties are again being effectively carried out.

1.7.1.3 Safety Meetings

Conduct safety meetings to review past activities, plan for new or changed

operations, review pertinent aspects of appropriate AHA (by trade), establish safe working procedures for anticipated hazards, and provide pertinent Safety and Occupational Health (SOH) training and motivation. Conduct meetings at least once a month for all supervisors at the project location. The SSHO, supervisors, or foremen must conduct meetings at least once a week for the trade workers. Document meeting minutes to include the date, persons in attendance, subjects discussed, and names of individual(s) who conducted the meeting. Maintain documentation on-site and furnish copies to the Contracting Officer on request. Notify the Contracting Officer of all scheduled meetings 7 calendar days in advance.

1.7.2 Roles and Responsibilities of Prime Contractor and SSHO

The Prime Contractor and SSHO must ensure that the requirements of all applicable OSHA and EM 385-1-1 are met for the project. The Prime Contractor must ensure an SSHO or an equally qualified Alternate SSHO(s) is at the worksite at all times to implement and administer the Contractor's safety program and Government accepted Accident Prevention Plan. If the required SSHO has to temporarily (that is, up to 24 hours/ 1 day) leave the site of work due to unforeseen or emergency situations, a Level One, Two, or Three SSHO may be used in the interim and must be on the site of work at all times when work is being performed.

If the SSHO must be off-site for a period longer than 24 hours/ 1 day, a qualified alternate that meets the contract requirements must be onsite.

a. Prime contractor must ensure all SSHOs will:

(1) Are designated on an ENG Form 6282.

(2) Meet minimum training and experience requirements identified in EM 385-1-1.

(3) Execute roles and responsibilities identified in EM 385-1-1.

1.7.3 Contract Site Safety And Health Officer(s)(SSHOs) Minimum Requirements

Provide a minimum of one Level One SSHO that meets the requirements of EM 385-1-1 for this project.

1.7.4 Competent Person for Confined Space Entry

Provide a CP for Confined Space Entry who meets the requirements of EM 385-1-1 and herein. The CP for Confined Space Entry must supervise the entry into each confined space in accordance with EM 385-1-1.

1.7.5 Preconstruction Conference

a. Contractor representatives who have a responsibility or significant role in accident prevention on the project must attend the preconstruction conference. This includes the project superintendent, Site Safety and Occupational Health Officer, quality control manager, or any other assigned safety and health professionals who participated in the development of the APP (including the Activity Hazard Analyses (AHAs) and special plans, program and procedures associated with it).

b. Discuss the details of the submitted APP to include incorporated plans, programs, procedures and a listing of anticipated AHAs that will be developed and implemented during the performance of the Contract. This

list of proposed AHAs will be reviewed and an agreement will be reached between the Contractor and the Contracting Officer as to which phases will require an analysis. In addition, establish a schedule for the preparation, submittal, and Government review of AHAs to preclude project delays. The creation of the APP and Schedule will be created after being given Notice to Proceed.

c. Deficiencies in the submitted APP, identified during the Contracting Officer's review, must be corrected, and the APP re-submitted for review prior to the start of construction. Work is not permitted to begin until an APP is established that is acceptable to the Contracting Officer.

1.8 ACCIDENT PREVENTION PLAN (APP)

1.8.1 Accident Prevention Plan (APP) Design

Provide a site-specific Accident Prevention Plan (APP), including Activity Hazard Analyses (AHA), in accordance with EM 385-1-1, ENG Form 6293, for the design team to follow during site visits and investigations. For subsequent visits, update the plan if there are changes in the personnel who will be attending, or the tasks to be performed. Submit the APP for review and acceptance by the Government at least 15 calendar days prior to the start of the design field work after being given Notice to Proceed. Field work must not begin until the design APP is accepted by the Contracting Officer. Prior to the start of construction incorporate the Design APP into the Construction APP so that one site specific APP exists for the project and submit to the Contracting Officer for acceptance.

If the design scope includes borings or other subsurface investigations, include in the APP the type of field investigation and verification techniques, such as visual, local utility locating service scanning and third party subcontractor scanning, potholing, or hand digging within two feet of a known utility that will be required. Mark underground utilities before starting any ground-disturbing actions. Notify the Contracting Officer 15 days prior to the start of soil borings or sub-surface investigations.

1.8.2 Accident Prevention Plan (APP) Construction

Submit the Accident Prevention Plan (APP) for review and acceptance by the Government at least 15 calendar days prior to the start, after being given Notice to Proceed. A competent person must prepare the written site-specific APP. Prepare the APP in accordance with the format and requirements of EM 385-1-1, ENG Form 6293, and herein. The APP must be job-specific and address any unusual or unique aspects of the project or activity for which it is written. The APP must interface with the Contractor's overall safety and occupational health program referenced in the APP in the applicable APP element, and made site-specific. Describe the methods to evaluate past safety performance of potential subcontractors in the selection process. Also, describe innovative methods used to ensure and monitor safe **work** practices of subcontractors. The Government considers the Prime Contractor to be the "controlling employer" for all worksite safety and health of the subcontractors. Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the Contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention

responsibilities are being carried out. The APP must be signed in accordance with the APP and ENG Form 6293 Accident Prevention Plan Worksheet. The SSHO must provide and maintain the APP and a log of signatures by each subcontractor foreman, attesting that they have read and understand the APP, and make the APP and log available on-site to the Contracting Officer. If English is not the foreman's primary language, the Prime Contractor must provide an interpreter.

Work cannot proceed without an accepted APP. Once reviewed and accepted by the Contracting Officer, the APP and attachments will be enforced as part of the Contract. Disregarding the provisions of this Contract or the accepted APP is cause for stopping of work, at the discretion of the Contracting Officer, until the matter has been rectified. Continuously review and amend the APP, as necessary, throughout the life of the Contract. Changes to the accepted APP must be made with the knowledge and concurrence of the Contracting Officer, project superintendent, SSHO and Quality Control Manager. Incorporate unusual or high-hazard activities not identified in the original APP as they are discovered. Should any severe hazard exposure (i.e., imminent danger) become evident, stop work in the area, secure the area, and develop a plan to remove the exposure and control the hazard. Notify the Contracting Officer within 24 hours of discovery. Eliminate and remove the hazard. In the interim, take all necessary action to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public (as defined by ANSI/ASSP A10.34), and the environment.

1.8.3 Names and Qualifications

Provide plans in accordance with the requirements outlined in EM 385-1-1, including the following:

a. Names and qualifications (resumes including education, training, experience and certifications) of site safety and health personnel designated to perform work on this project to include the designated Site Safety and Health Officer and other competent and qualified personnel to be used. Specify the duties of each position.

b. As a minimum, designate and submit qualifications of Competent Persons (CP) for each of the following major areas: excavation; scaffolding; fall protection; hazardous energy; confined space; health hazard recognition, evaluation and control of chemical, physical and biological agents; and personal protective equipment and clothing to include selection, use and maintenance. Designate and submit qualifications for additional CPs as applicable to the work performed under this Contract.

1.8.4 Plans

Provide plans in the APP in accordance with the requirements outlined in EM 385-1-1, including the following:

1.8.4.1 Lead, Cadmium, and Chromium Compliance Plan

Identify the safety and health aspects of work involving lead, cadmium and chromium, and prepare in accordance with Section 02 83 00 LEAD REMEDIATION.

1.8.4.2 Asbestos Hazard Abatement Plan

Identify the safety and health aspects of asbestos work, and prepare in

accordance with Section 02 82 00 ASBESTOS REMEDIATION.

1.8.4.3 Site Safety and Health Plan

Identify the safety and health aspects, and prepare in accordance with 01 35 26 Governmental Safety Requirements

1.8.4.4 Site Demolition Plan

Identify the safety and health aspects, and prepare in accordance with Section 02 41 00 DEMOLITION AND DECONSTRUCTION and referenced sources.

1.9 ACTIVITY HAZARD ANALYSIS (AHA)

Before beginning each activity, task or Definable Feature of Work (DFOW) involving a type of work presenting hazards not experienced in previous project operations, or where a new work crew or subcontractor is to perform the work, the Contractor(s) performing that work activity must prepare an AHA. AHAs must be developed by the Prime Contractor, subcontractor, or supplier performing the work, and provided for Prime Contractor review and approval before submitting to the Contracting Officer. AHAs must be signed by the SSHO, Superintendent, QC Manager and the subcontractor Foreman performing the work. Format the AHA in accordance with EM 385-1-1 or as directed by the Contracting Officer. Submit the AHA for review at least 15 working days prior to the start of each activity task, or DFOW. The Government reserves the right to require the Contractor to revise and resubmit the AHA if it fails to effectively identify the work sequences, specific anticipated hazards, site conditions, equipment, materials, personnel and the control measures to be implemented.

AHAs must identify competent persons required for phases involving high risk activities, including but not limited to, confined entry, crane and rigging, excavations,trenching, electrical work, fall protection, and scaffolding.

1.9.1 AHA Management

Review the AHA list periodically (at least monthly) at the Contractor supervisory safety meeting, and update as necessary when procedures, scheduling, or hazards change. Use the AHA during daily inspections by the SSHO to ensure the implementation and effectiveness of the required safety and health controls for that work activity.

1.9.2 AHA Signature Log

Each employee performing work as part of an activity, task or DFOW must review the AHA for that work and sign a signature log specifically maintained for that AHA prior to starting work on that activity. The SSHO must maintain a signature log on site for every AHA. Provide employees whose primary language is other than English, with an interpreter to ensure a clear understanding of the AHA and its contents.

1.10 SITE SAFETY REFERENCE MATERIALS

Maintain safety-related references applicable to the project, including those listed in paragraph REFERENCES. Maintain applicable equipment manufacturer's manuals.

1.11 EMERGENCY MEDICAL TREATMENT

Contractors must arrange for their own emergency medical treatment in accordance with EM 385-1-1. The Government has no responsibility to provide emergency medical treatment.

1.12 NOTIFICATIONS AND REPORTS

1.12.1 Accident Notification

Notify the Contracting Officer in accordance with the EM 385-1-1 Accident Reporting Timeline.

Table
Accident Reporting Required Timeline

Accident Type	Notify KO or COR	Complete Final Accident Report on ENG 3394 and provide to KO or COR
Fatality, in-patient hospitalization, amputation, eye loss, or property damage over $600,000.	Immediately, no later than (NLT) 8 Hours	Within 7 Days
All other accidents and near misses	Immediately, no later than (NLT) 24 Hours	Within 7 Days

Within notification include Contractor name; Contract title; type of Contract; name of activity, installation or location where accident occurred; date and time of accident; names of personnel injured; extent of property damage, if any; extent of injury, if known, and brief description of accident (for example, type of construction equipment used and PPE used). Preserve the conditions and evidence on the accident site until the Government investigation team arrives on-site and Government investigation is conducted. Assist and cooperate fully with the Government's investigation(s) of any accident or near miss.

1.12.2 Accident Reports

a. Conduct an accident investigation for recordable injuries and illnesses, property damage, and near misses as defined in EM 385-1-1, to establish the root cause(s) of the accident. All accidents are reportable, regardless of whether or not it is recordable. Complete the applicable USACE Accident Report, ENG Form 3394, and provide the report to the Contracting Officer within 7 calendar days of the accident. The Contracting Officer will provide copies of any required or special forms. All accidents are reportable, regardless of whether or not it is recordable.

b. Near Misses: For Army projects, report all "Near Misses" to the GDA, Contracting Officer, using local accident reporting procedures, within 24 hours. The Contracting Officer will provide the Contractor the required forms. Near miss reports are considered positive and proactive Contractor safety management actions.

1.12.3 LHE Inspection Reports

Submit LHE inspection reports required in accordance with EM 385-1-1 and as specified herein with Daily Reports of Inspections.

1.12.4 Certificate of Compliance and Pre-lift Plan/Checklist for LHE and Rigging

1.12.4.1 Certificate of Compliance

Provide a Certificate of Compliance for LHE utilized to perform work under this Contract in accordance with Section 16-7 of the EM 385-1-1. Post completed certificate on the crane.

1.12.4.2 Pre-Lift Plans

Develop either a Standard Lift Plan (SLP) or Critical Lift Plan (CLP) as required in accordance with EM 385-1-1. Utilize the Standard Lift Plan ENG Form 6203 for routine crane lifts and use the Critical Lift Plan ENR Form 6213 for non-routine crane lifts requiring more detailed planning and additional safety precautions, as defined by Section 16-2j of the EM 385-1-1. Submit lift plans to the Contracting Officer for approval within 15 calendar days in advance of planned lift.

1.13 HOT WORK PERMIT

1.13.1 Permit and Personnel Requirements

Submit and obtain a written permit prior to performing "Hot Work'' (i.e., welding or cutting) or operating other flame-producing/spark producing devices, from the Fire Division. A permit is required from the Explosives Safety Office for work in and around where explosives are processed, stored, or handled. Contractors are required to meet all criteria before a permit is issued. Provide at least two 20 pound 4A:20 BC rated extinguishers for normal "Hot Work". The extinguishers must be current inspection tagged, and contain an approved safety pin and tamper resistant seal. It is also mandatory to have a designated FIRE WATCH for any "Hot Work" done at this activity. The Fire Watch must be trained in accordance with NFPA 51B and remain on-site for a minimum of 1 hour after completion of the task or as specified on the hot work permit.

When starting work in the facility, require personnel to familiarize themselves with the location of the nearest fire alarm boxes and place in memory the emergency Fire Division phone number. Report any fire, no matter how small, to the responsible Fire Division immediately.

1.13.2 Work Around Flammable Materials

Obtain permit approval from a NFPA Certified Marine Chemist, or Certified Industrial Hygienist for "Hot Work" within or around flammable materials (such as fuel systems or welding/cutting on fuel pipes) or confined spaces (such as sewer wet wells, manholes, or vaults) that have the potential for flammable or explosive atmospheres.

Whenever these materials, except beryllium and chromium (VI), are encountered in indoor operations, local mechanical exhaust ventilation systems that are sufficient to reduce and maintain personal exposures to within acceptable limits must be used and maintained in accordance with manufacturer's instruction and supplemented by exceptions noted in

EM 385-1-1.

1.14 RADIATION SAFETY REQUIREMENTS

Submit License Certificates, employee training records, and Leak Test Reports for radiation materials and equipment to the Contracting Officer and Radiation Safety Office (RSO) for all specialized and licensed material and equipment proposed for use on the construction project (excludes portable machine sources of ionizing radiation including moisture density and X-Ray Fluorescence (XRF)). Maintain on-site records whenever licensed radiological materials or ionizing equipment are on Government property.

Protect workers from radiation exposure in accordance with 10 CFR 20, ensuring any personnel exposures are maintained As Low As Reasonably Achievable.

1.14.1 Radiography Operation Planning Work Sheet

Submit a Gamma and X-Ray Radiography Operation Planning Work Sheet to Contracting Officer 14 days prior to commencement of operations involving radioactive materials or radiation generating devices. For portable machine sources of ionizing radiation, including moisture density and XRF, use and submit the Portable Gauge Operations Planning Worksheet instead. The Contracting Officer will review the submitted worksheet and provide questions and comments.

Contractors must use primary dosimeters process by a National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory.

1.14.2 Site Access and Security

Coordinate site access and security requirements with the Contracting Officer for all radiological materials and equipment containing ionizing radiation that are proposed for use on a government facility. For gamma radiography materials and equipment, a Government escort is required for any travels on the Installation. The Government authorized representative will meet the Contractor at a designated location outside the Installation, ensure safety of the materials being transported, and will escort the Contractor for gamma sources onto the Installation, to the job site, and off the Installation. For portable machine sources of ionizing radiation, including moisture density and XRF, the Government authorized representative will meet the Contractor at the job site.

Provide a copy of all calibration records, and utilization records for radiological operations performed on the site.

1.14.3 Loss or Release and Unplanned Personnel Exposure

Loss or release of radioactive materials, and unplanned personnel exposures must be reported immediately to the Contracting Officer, RSO, and Base Security Department Emergency Number.

1.14.4 Site Demarcation and Barricade

Properly demark and barricade an area surrounding radiological operations to preclude personnel entrance, in accordance with EM 385-1-1, Nuclear Regulatory Commission, and Applicable State regulations and license requirements, and in accordance with requirements established in the accepted Radiography Operation Planning Work Sheet.

Do not close or obstruct streets, walks, and other facilities occupied and used by the Government without written permission from the Contracting Officer.

1.14.5 Security of Material and Equipment

Properly secure the radiological material and ionizing radiation equipment at all times, including keeping the devices in a properly marked and locked container, and secondarily locking the container to a secure point in the Contractor's vehicle or other approved storage location during transportation and while not in use. While in use, maintain a continuous visual observation on the radiological material and ionizing radiation equipment. In instances where radiography is scheduled near or adjacent to buildings or areas having limited access or one-way doors, make no assumptions as to building occupancy. Where necessary, the Contracting Officer will direct the Contractor to conduct an actual building entry, search, and alert. Where removal of personnel from such a building cannot be accomplished and it is otherwise safe to proceed with the radiography, position a fully instructed employee inside the building or area to prevent exiting while external radiographic operations are in process.

1.14.6 Transportation of Material

Comply with 49 CFR 173 for Transportation of Regulated Amounts of Radioactive Material. Notify Local Fire authorities and the site Radiation Safety Officer (RSO) of any Radioactive Material use.

1.14.7 Schedule for Exposure or Unshielding

Actual exposure of the radiographic film or unshielding the source must not be initiated until after 5 p.m. on weekdays.

1.14.8 Transmitter Requirements

Adhere to the base policy concerning the use of transmitters, such as radios and cell phones. Obey Emissions control (EMCON) restrictions.

1.15 CONFINED SPACE ENTRY REQUIREMENTS

Confined space entry must comply with EM 385-1-1, 29 CFR 1926, 29 CFR 1910, and Directive CPL 2.100. Any potential for a hazard in the confined space requires a permit system to be used.

1.15.1 Rescue Procedures and Coordination with Local Emergency Responders

Develop and implement an on-site rescue and recovery plan and procedures. The rescue plan must not rely on local emergency responders for rescue from a confined space.

1.16 SEVERE STORM PLAN

In the event of a severe storm warning, the Contractor must comply with the applicable Storm Plan and:

a. Secure outside equipment and materials and place materials that could be damaged in protected areas.

b. Check surrounding area, including roof, for loose material, equipment,

debris, and other objects that could be blown away or against existing facilities.

c. Ensure that temporary erosion controls are adequate.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 CONSTRUCTION AND OTHER WORK

Comply with EM 385-1-1, NFPA 70, NFPA 70E, NFPA 241, the APP, the AHA, Federal and State OSHA regulations, and other related submittals and activity fire and safety regulations. The most stringent standard prevails.

PPE is governed in all areas by the nature of the work the employee is performing. Use personal hearing protection at all times in designated noise hazardous areas or when performing noise hazardous tasks. Safety glasses must be worn or carried/available on each person. Mandatory PPE includes:

a. Head Protection that meets ANSI/ISEA Z89.1

b. Long Pants

c. Appropriate Safety Footwear

d. Appropriate Class Reflective Vests

3.1.1 Worksite Communication

Employees working alone in a remote location or away from other workers must be provided an effective means of emergency communications (i.e., cellular phone, two-way radios, land-line telephones or other acceptable means). The selected communication must be readily available (easily within the immediate reach) of the employee and must be tested prior to the start of work to verify that it effectively operates in the area/environment. Develop an employee check-in/check-out communication procedure to ensure employee safety.

3.1.2 Hazardous Material Exclusions

Notwithstanding any other hazardous material used in this Contract, radioactive materials or instruments capable of producing ionizing/non-ionizing radiation (with the exception of radioactive material and devices used in accordance with EM 385-1-1 such as nuclear density meters for compaction testing and laboratory equipment with radioactive sources) as well as materials which contain asbestos, mercury or polychlorinated biphenyls, di-isocyanates, lead-based paint, and hexavalent chromium, are prohibited. The Contracting Officer, upon written request by the Contractor, may consider exceptions to the use of any of the above excluded materials. Low mercury lamps used within fluorescent lighting fixtures are allowed as an exception without further Contracting Officer approval. Notify the Radiation Safety Officer (RSO) prior to excepted items of radioactive material and devices being brought on base.

3.1.3 Unforeseen Hazardous Material

Contract documents identify materials such as PCB, lead paint, and friable and non-friable asbestos and other OSHA regulated chemicals (i.e., 29 CFR 1910). If material(s) that can be hazardous to human health upon disturbance are encountered during demolition, repair, renovation, or construction operations, stop portions of work that would disturb the material and notify the Contracting Officer immediately. Within 14 calendar days the Government will determine if the material is hazardous. If material is not hazardous or poses no danger, the Government will direct the Contractor to proceed without change. If material is hazardous and handling of the material is necessary to accomplish the work, the Government will issue a modification.

3.2 UTILITY OUTAGE REQUIREMENTS

Apply for utility outages at least 14 days in advance. At a minimum, the written request must include the location of the outage, utilities being affected, duration of outage, any necessary sketches, and a description of the means to fulfill energy isolation requirements in accordance with EM 385-1-1. In accordance with EM 385-1-1, where outages involve Government or Utility personnel, coordinate with the Government on all activities involving the control of hazardous energy.

These activities include, but are not limited to, a review of Hazardous Energy Control Program (HECP) and HEC procedures, as well as applicable Activity Hazard Analyses (AHAs). In accordance with EM 385-1-1 and NFPA 70E, work on energized electrical circuits must not be performed without prior Government authorization. Government permission is considered through the permit process and submission of a detailed AHA. Energized work permits are considered only when de-energizing introduces additional or increased hazard or when de-energizing is infeasible.

3.3 OUTAGE COORDINATION MEETING

After the utility outage request is approved and prior to beginning work on the utility system requiring shut-down, conduct a pre-outage coordination meeting in accordance with EM 385-1-1. This meeting must include the Prime Contractor, the Prime and subcontractors performing the work, the Contracting Officer, and the Installation representative. All parties must fully coordinate HEC activities with one another. During the coordination meeting, all parties must discuss and coordinate on the scope of work, HEC procedures (specifically, the lock-out/tag-out procedures for worker and utility protection), the AHA, assurance of trade personnel qualifications, identification of competent persons, and compliance with HECP training in accordance with EM 385-1-1. Clarify when personal protective equipment is required during switching operations, inspection, and verification.

3.4 CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT)

Provide and operate a Hazardous Energy Control Program (HECP) in accordance with EM 385-1-1, 29 CFR 1910, 29 CFR 1915, ANSI/ASSP A10.44, NFPA 70E.

3.4.1 Safety Preparatory Inspection Coordination Meeting with the Government or Utility

For electrical distribution equipment that is to be operated by Government or Utility personnel, the Prime Contractor and the subcontractor performing the work must attend the safety preparatory inspection coordination

meeting, which will also be attended by the Contracting Officer's Representative, and required by EM 385-1-1. The meeting will occur immediately preceding the start of work and following the completion of the outage coordination meeting. Both the safety preparatory inspection coordination meeting and the outage coordination meeting must occur prior to conducting the outage and commencing with lockout/tagout procedures.

3.4.2 Lockout/Tagout Isolation

Where the Government or Utility performs equipment isolation and lockout/tagout, the Contractor must place their own locks and tags on each energy-isolating device and proceed in accordance with the HECP. Before any work begins, both the Contractor and the Government or Utility must perform energy isolation verification testing while wearing required PPE detailed in the Contractor's AHA and required by EM 385-1-1. Install personal protective grounds, with tags, to eliminate the potential for induced voltage in accordance with EM 385-1-1.

3.4.3 Lockout/Tagout Removal

Upon completion of work, conduct lockout/tagout removal procedure in accordance with the HECP. In accordance with EM 385-1-1, each lock and tag must be removed from each energy isolating device by the authorized individual or systems operator who applied the device. Provide formal notification to the Government (by completing the Government form if provided by Contracting Officer's Representative), confirming that steps of de-energization and lockout/tagout removal procedure have been conducted and certified through inspection and verification. Government or Utility locks and tags used to support the Contractor's work will not be removed until the authorized Government employee receives the formal notification.

3.5 FALL PROTECTION PROGRAM

Establish a fall protection program, for the protection of all employees exposed to fall hazards. Within the program include company policy, identify roles and responsibilities, education and training requirements, fall hazard identification, prevention and control measures, inspection, storage, care and maintenance of fall protection equipment and rescue and evacuation procedures in accordance with EM 385-1-1.

3.5.1 Fall Protection Equipment and Systems

Enforce use of personal fall protection equipment and systems designated (to include fall arrest, restraint, and positioning) for each specific work activity in the Site Specific Fall Protection and Prevention Plan and AHA at all times when an employee is exposed to a fall hazard. Protect employees from fall hazards as specified in EM 385-1-1.

Provide personal fall protection equipment, systems, subsystems, and components that comply with EM 385-1-1 and 29 CFR 1926.

3.5.1.1 Additional Personal Fall Protection Measures

In addition to the required fall protection systems, other protective measures such as safety skiffs, personal floatation devices, and life rings, are required when working above or next to water in accordance with EM 385-1-1. Personal fall protection systems and equipment are required when working from an articulating or extendible boom, swing stages, or suspended platform. In addition, personal fall protection systems are

required when operating other equipment such as scissor lifts. The need for tying-off in such equipment is to prevent ejection of the employee from the equipment during raising, lowering, travel, or while performing work.

3.5.1.2 Personal Fall Protection Equipment

Only a full-body harness with a shock-absorbing lanyard or self-retracting lanyard is an acceptable personal fall arrest body support device. The use of body belts is not acceptable. Harnesses must have a fall arrest attachment affixed to the body support (usually a Dorsal D-ring) and specifically designated for attachment to the rest of the system. Snap hooks and carabineers must be self-closing and self-locking, capable of being opened only by at least two consecutive deliberate actions and have a minimum gate strength of 3,600 lbs in all directions. Use webbing, straps, and ropes made of synthetic fiber. The maximum free fall distance when using fall arrest equipment must not exceed 6 feet, unless the proper energy absorbing lanyard is used. Always take into consideration the total fall distance and any swinging of the worker (pendulum-like motion), that can occur during a fall, when attaching a person to a fall arrest system. Equip all full body harnesses with Suspension Trauma Preventers such as stirrups, relief steps, or similar in order to provide short-term relief from the effects of orthostatic intolerance in accordance with EM 385-1-1.

3.6 USE OF EXPLOSIVES

Explosives must not be used or brought to the project site without prior written approval from the Contracting Officer. Such approval does not relieve the Contractor of responsibility for injury to persons or for damage to property due to blasting operations.

Storage of explosives, when permitted on Government property, must be only where directed and in approved storage facilities. These facilities must be kept locked at all times except for inspection, delivery, and withdrawal of explosives.

3.7 ELECTRICAL

Perform electrical work in accordance with EM 385-1-1.

3.7.1 Electrical Work

As described in EM 385-1-1, electrical work is to be conducted in a de-energized state unless there is no alternative method for accomplishing the work. In those cases obtain an energized work permit from the Contracting Officer. The energized work permit application must be accompanied by the AHA and a summary of why the equipment/circuit needs to be worked energized. Underground electrical spaces must be certified safe for entry before entering to conduct work. Cables that will be cut must be positively identified and de-energized prior to performing each cut. Attach temporary grounds in accordance with ASTM F855 and IEEE 1048. Perform all high voltage cable cutting remotely using hydraulic cutting tool. When racking in or live switching of circuit breakers, no additional person other than the switch operator is allowed in the space during the actual operation. Plan so that work near energized parts is minimized to the fullest extent possible. Use of electrical outages clear of any energized electrical sources is the preferred method.

When working in energized substations, only qualified electrical workers are permitted to enter. When work requires work near energized circuits as

defined by NFPA 70, high voltage personnel must use personal protective equipment that includes, as a minimum, electrical hard hat, safety footwear, insulating gloves and electrical arc flash protection for personnel as required by NFPA 70E. Insulating blankets, hearing protection, and switching suits may also be required, depending on the specific job and as delineated in the Contractor's AHA. Ensure that each employee is familiar with and complies with these procedures and 29 CFR 1910.

3.7.2 Qualifications

Electrical work must be performed by QP with verifiable credentials who are familiar with applicable code requirements. Verifiable credentials consist of State, National and Local Certifications or Licenses that a Master or Journeyman Electrician may hold, depending on work being performed, and must be identified in the appropriate AHA. Journeyman/Apprentice ratio must be in accordance with State, Local requirements applicable to where work is being performed.

3.7.3 Arc Flash

Conduct a hazard analysis/arc flash hazard analysis whenever work on or near energized parts greater than 50 volts is necessary, in accordance with NFPA 70E.

All personnel entering the identified arc flash protection boundary must be QPs and properly trained in NFPA 70E requirements and procedures. Unless permitted by NFPA 70E, no Unqualified Person is permitted to approach nearer than the Limited Approach Boundary of energized conductors and circuit parts. Training must be administered by an electrically qualified source and documented.

3.7.4 Grounding

Ground electrical circuits, equipment and enclosures in accordance with NFPA 70 and IEEE C2 to provide a permanent, continuous and effective path to ground unless otherwise noted by EM 385-1-1.

3.7.5 Testing

Temporary electrical distribution systems and devices must be inspected, tested and found acceptable for Ground-Fault Circuit Interrupter (GFCI) protection, polarity, ground continuity, and ground resistance before initial use, before use after modification and at least monthly. Monthly inspections and tests must be maintained for each temporary electrical distribution system, and signed by the electrical CP or QP.

-- End of Section --

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SECTION 01 42 00

SOURCES FOR REFERENCE PUBLICATIONS
05/24

PART 1 GENERAL

1.1 REFERENCES

Various publications are referenced in other sections of the specifications to establish requirements for the work. These references are identified in each section by document number, date and title. The document number used in the citation is the number assigned by the standards producing organization (e.g., ASTM B564 Standard Specification for Nickel Alloy Forgings). However, when the standards producing organization has not assigned a number to a document, an identifying number has been assigned for reference purposes.

1.2 ORDERING INFORMATION

The addresses of the standards publishing organizations whose documents are referenced in other sections of these specifications are listed below, and if the source of the publications is different from the address of the sponsoring organization, that information is also provided.

AACE INTERNATIONAL (AACE)
726 East Park Avenue #180
Fairmont, WV 26554 USA
Ph: 304-296-8444
Fax: 304-291-5728
Internet: https://web.aacei.org/

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
555 12th Street NW, Suite 1000
Washington, DC 20004
Ph: 202-624-5800
Fax: 202-624-5806
E-Mail: info@aashto.org
Internet: https://www.transportation.org/

AMERICAN PETROLEUM INSTITUTE (API)
200 Massachusetts Avenue NW Suite 1100
Washington, DC 20001-5571
Ph: 202-682-8000
Internet: https://www.api.org/

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)
1801 Alexander Bell Drive
Reston, VA 20191
Ph: 800-548-2723; 703-295-6300
Email: customercare@asce.org
Internet: https://www.asce.org/

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)
180 Technology Parkway NW
Peachtree Corners, GA 30092

Ph: 404-636-8400 or 800-527-4723
Fax: 404-321-5478
E-mail: ashrae@ashrae.org
Internet: https://www.ashrae.org/

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)
Two Park Avenue
New York, NY 10016-5990
Ph: 800-843-2763
Fax: 973-882-1717
E-mail: customercare@asme.org
Internet: https://www.asme.org/

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)
520 N. Northwest Highway
Park Ridge, IL 60068
Ph: 847-699-2929
E-mail: customerservice@assp.org
Internet: https://www.assp.org/

AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE)
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448
Ph: 708-995-3019
Fax: 708-479-6139
Internet: http://www.asse-plumbing.org

AMERICAN WATER WORKS ASSOCIATION (AWWA)
6666 W. Quincy Avenue
Denver, CO 80235 USA
Ph: 303-794-7711 or 800-926-7337
Fax: 303-347-0804
Internet: https://www.awwa.org/

ASM INTERNATIONAL (ASM)
9639 Kinsman Road
Materials Park, OH 44073-0002
Ph: 440-671-3800 (US),
E-mail: memberservicecenter@asminternational.org
Internet: https://www.asminternational.org/

ASSOCIATED AIR BALANCE COUNCIL (AABC)
1015 18th St. NW Suite 603
Washington, DC 20036
Ph: 202-737-0202
Fax: 202-315-0285
E-mail: info@aabc.com
Internet: https://www.aabc.com/

ASTM INTERNATIONAL (ASTM)
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959
Ph: 610-832-9500
Fax: 610-832-9555
E-mail: service@astm.org
Internet: https://www.astm.org/

CARPET AND RUG INSTITUTE (CRI)
P.O. Box 2048

Dalton, GA 30722-2048
Ph: 706-278-3176
Fax: 706-278-8835
Internet: https://carpet-rug.org/

COMPRESSED GAS ASSOCIATION (CGA)
8484 Westpark Drive Suite 220
McLean, Virginia 22102
Ph: 703-788-2700
Fax: 703-961-1831
E-mail: cga@cganet.com
Internet: https://www.cganet.com/

COUNCIL ON ENVIRONMENTAL QUALITY (CEQ) (WHITE HOUSE)
722 Jackson Place
Washington DC 20506
Internet: https://www.whitehouse.gov/administration/eop/ceq

GREEN SEAL (GS)
601 13th St NW 12th Floor
Washington, DC 20005
Ph: 202-872-6400
Fax: 202-872-4324
E-mail: greenseal@greenseal.org
Internet: https://www.greenseal.org/

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)
445 and 501 Hoes Lane
Piscataway, NJ 08854-4141
Ph: 732-981-0060 or 800-701-4333
Fax: 732-981-9667
E-mail: onlinesupport@ieee.org
Internet: https://www.ieee.org/

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA)
800 Place Victoria
PO Box 113
Montréal, Quebec, H4Z 1M1
Ph: 514-390-6726 or 800-716-6326
Fax: 514-874-9659
E-mail: custserv@iata.org
Internet: https://www.iata.org/

INTERNATIONAL CODE COUNCIL (ICC)
200 Massachusetts Ave, NW Suite 250
Washington, DC 20001
Ph: 800-786-4452 or 888-422-7233
Fax: 202-783-2348
E-mail: order@iccsafe.org
Internet: https://www.iccsafe.org/

INTERNATIONAL MARITIME DANGEROUS GOODS (IMDG)
5724 North Pulaski Road
Chicago, IL 60646
Internet: https://www.labelmaster.com/

INTERNATIONAL SAFETY EQUIPMENT ASSOCIATION (ISEA)
1101 Wilson Blvd, Suite 1425
Arlington, VA 22209-1762
Ph: 703-525-1695
Fax: 703-528-2148
Internet: https://safetyequipment.org/

NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB)
8575 Grovemont Circle
Gaithersburg, MD 20877
Ph: 301-977-3698
Fax: 301-977-9589
Internet: http://www.nebb.org

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
1 Batterymarch Park
Quincy, MA 02169-7471
Ph: 800-344-3555
Fax: 800-593-6372
Internet: https://www.nfpa.org

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)
Patriots Plaza 1
395 E Street, SW, Suite 9200
Washington, DC 20201
Ph: 800-232-4636
Fax: 513-533-8347
Internet: https://www.cdc.gov/niosh/

SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)
4201 Lafayette Center Drive
Chantilly, VA 20151-1219
Ph: 703-803-2980
Fax: 703-803-3732
Internet: https://www.smacna.org/

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA)
1320 North Courthouse Rosd, Suite 200
Arlington, VA 22201
Ph: 703-907-7700
Fax: 703-907-7727
E-mail: marketing@tiaonline.org
Internet: https://www.tiaonline.org/

U.S. ARMY CORPS OF ENGINEERS (USACE)
CRD-C DOCUMENTS available on Internet: https://www.wbdg.org/army
THE CAD/BIM TECHNOLOGY CENTER FOR FACILITIES, INFRASTRUCTURE, AND ENVIRONMENT (USACE)on Internet:
https://cadbimcenter.erdc.dren.mil/
Order Other Documents from:
Official Publications of the Headquarters, USACE
E-mail: hqpublications@usace.army.mil
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or
https://www.hnc.usace.army.mil/Missions/Engineering-Directorate/TECHINFO/

U.S. DEFENSE LOGISTICS AGENCY (DLA)
Andrew T. McNamara Building
8725 John J. Kingman Road
Fort Belvoir, VA 22060-6221
Ph: 877-352-2255
E-mail: dlacontactcenter@dla.mil
Internet: http://www.dla.mil

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Washington, DC 20250-1510
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Internet:
https://www.rd.usda.gov/about-rd/agencies/rural-utilities-service

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Obtain Military Specifications, Standards and Related Publications from:
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Department of Defense Single Stock Point (DODSSP)
Document Automation and Production Service (DAPS)
Building 4/D
700 Robbins Avenue
Philadelphia, PA 19111-5094
Ph: 215-697-6396 - for account/password issues
Internet: https://assist.dla.mil/online/start/; account registration required
Obtain Unified Facilities Criteria (UFC) from:
Whole Building Design Guide (WBDG)
National Institute of Building Sciences (NIBS)
1090 Vermont Avenue NW, Suite 700
Washington, DC 20005
Ph: 202-289-7800
Fax: 202-289-1092
Internet:
https://www.wbdg.org/ffc/dod/unified-facilities-criteria-ufc

U.S. DEPARTMENT OF ENERGY (DOE)
1000 Independence Avenue Southwest
Washington, D.C. 20585
Ph: 202-586-5000
Fax: 202-586-4403
E-mail: The.Secretary@hq.doe.gov
Internet: https://www.energy.gov/

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT (HUD)
HUD User
P.O. Box 23268
Washington, DC 20026-3268
Ph: 800-245-2691 or 202-708-3178
TDD: 800-927-7589
Fax: 202-708-9981
E-mail: helpdesk@huduser.gov
Internet: https://www.huduser.gov

U.S. DEPARTMENT OF TRANSPORTATION (DOT)
1200 New Jersey Ave., SE
Washington, DC 20590
Ph: 202-366-4000
Internet: https://www.transportation.gov/

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)
1200 Pennsylvania Avenue, N.W.
Washington, DC 20004
Ph: 202-564-4700
Internet: https://www.epa.gov
--- Some EPA documents are available only from:

National Technical Information Service (NTIS)
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Alexandria, VA 22312
Ph: 703-605-6060 or 1-800-363-2068
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TDD: 703-487-4639
E-mail: info@ntis.gov
Internet: https://www.ntis.gov/

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PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

-- End of Section --

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SECTION 01 45 00

QUALITY CONTROL
08/23, CHG 3: 08/25

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D3740	(2019) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM E90	(2023) Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
ASTM E329	(2025b) Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2024) Safety -- Safety and Occupational Health (SOH) Requirements
ER 1110-3-12	(2021) Military Engineering and Design Quality Management

1.2 PAYMENT

Separate payment will not be made for providing and maintaining an effective Quality Control program. Include **all** associated costs in the applicable Pricing Schedule item.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" or [11]8[11] classification. Submittals not having a "G" or [11]8[11] classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

SD-01 Preconstruction Submittals

Contractor Quality Control (CQC) Plan; G

Additional Requirements For Design Quality Control (DQC) Plan; G

SD-05 Design Data

Design Quality Control

Discipline-Specific Checklists

SD-06 Test Reports

Verification Statement

SD-07 Certificates

Certificate Of Readiness; G

1.4 GENERAL REQUIREMENTS

Establish and maintain an effective quality control (QC) system that complies with RFO 52.246-12 Inspection of Construction. QC is comprised of plans, procedures, and organization necessary to produce an end product that complies with the Contract requirements. The QC system covers all design and construction operations, both onsite and offsite, and must be keyed to the proposed design and construction sequence. The Quality Control Manager, Superintendent, Site Safety and Health Officer (SSHO), and all on-site supervisors are responsible for the quality of work and are subject to removal by the Contracting Officer for non-compliance with the quality requirements specified in the Contract. The Quality Control Manager must maintain a physical presence at the work site at all times and is the primary individual responsible for all quality control.

1.5 QUALITY CONTROL (QC) PROGRAM REQUIREMENTS

Establish and maintain a QC program as described in this section. This QC program is a key element in meeting the objectives of the Commissioning Process (Cx). The QC program consists of a QC Organization, QC Plan, QC Plan Meeting(s), a Coordination and Mutual Understanding Meeting, QC meetings, three phases of control, submittal review and approval, testing, completion inspections, QC certifications, independent Special Inspections in accordance with Section 01 45 35 SPECIAL INSPECTIONS, and documentation necessary to provide materials, equipment, workmanship, fabrication, construction and operations that comply with the requirements of this Contract. The QC program must cover on-site and off-site work and be keyed to the work sequence. No construction work or testing may be performed unless the QC Manager is on the work site. The QC Manager must report to an officer of the firm and not be subordinate to the Project Superintendent or the Project Manager. The QC Manager, Project Superintendent and Project Manager must work together effectively. Although the QC Manager is the primary individual responsible for quality control, all individuals will be held responsible for the quality of work on the job.

1.5.1 Meetings

1.5.1.1 Quality Control Plan Meeting

Prior to submission of the QC Plan, the Contractor may request a meeting with the Contracting Officer to discuss the QC Plan requirements of this Contract.

The purpose of this meeting is to develop a mutual understanding of the QC Plan requirements prior to plan development and submission and to agree on the Contractor's list of Definable Feature of Work (DFOW).

1.5.1.2 Coordination and Mutual Understanding Meeting

After the Post Award Conference, before start of design or construction, and prior to acceptance by the Government of the CQC Plan, meet with the Contracting Officer and discuss the Contractor's quality control system. During the meeting, a mutual understanding of the system details must be developed, including the forms for recording the CQC operations, design activities, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting will be prepared by the QC Manager and signed by the Contractor, the Architect/Engineer (A/E), and the Government. Provide a copy of the signed minutes to all attendees and incorporate into the relevant QC Plan. At a minimum the Coordination and Mutual Understanding Meeting must be repeated when a new QC Manager is appointed. There can be other occasions when subsequent conferences will be called by either party to reconfirm mutual understandings or address deficiencies in the CQC system or procedures which can require corrective action by the Contractor.

1.5.1.2.1 Purpose

The purpose of this meeting is to develop a mutual understanding of the QC details, including documentation, administration for on-site and off-site work, design intent, Cx in accordance with Section 01 91 00.15 BUILDING COMMISSIONING, environmental requirements and procedures, coordination of activities to be performed, Special Inspections, and the coordination of the Contractor's management, production, and QC personnel. At the meeting, the Contractor must explain in detail how three phases of control will be implemented for each DFOW, as well as how each DFOW will be affected by each management plan or requirement as listed below:

a. Waste Management Plan.

b. Procedures for noise and acoustics management.

c. Environmental Protection Plan.

d. Environmental regulatory requirements.

e. Cx Plan requirements in accordance with Section 01 91 00.15 BUILDING COMMISSIONING.

f. Special Inspections.

g. Indoor Air Quality (IAQ) Management Plan.

1.5.1.2.2 Coordination of Activities

Coordinate activities included in various sections to assure efficient and orderly installation of each component. Coordinate operations included under different sections that are dependent on each other for proper installation and operation. Schedule construction operations with consideration for indoor air quality as specified in the IAQ Management Plan.Coordinate Special Inspections.

1.5.1.2.3 Attendees

As a minimum, the Contractor's personnel required to attend include an

officer of the firm, the Project Manager, Project Superintendent, QC Manager, Alternate QC Manager, Assistant QC Manager, Special Inspector, Commissioning Provider (CxC), Environmental Manager, and subcontractor representatives. Each subcontractor who will be assigned QC responsibilities must have a principal of the firm at the meeting.

1.5.1.3 Quality Control {QC) Meetings

After the start of construction, conduct weekly QC meetings led by the QC Manager at the work site with the Project Superintendent, the Special Inspector, CxC, and the other personnel as necessary. The QC Manager is to prepare the minutes of the meeting and provide a copy to the Contracting Officer within 2 working days after the meeting. The Contracting Officer may attend these meetings. As a minimum, accomplish the following at each meeting:

a. Review the minutes of the previous meeting.

b. Review the schedule and the status of work and deficiencies/rework. Review the most current approved schedule (in accordance with schedule specification) and the status of work and deficiencies/rework.

c. Review the status of submittals and Request For Information (RFis)

d. Review the work to be accomplished in the next 3 weeks as defined by the schedule section paragraph WEEKLY PROGRESS MEETINGS in Section 01 32 01.00 10 PROJECT SCHEDULE and all quality control documentation required for that work.

e. Review Testing Plan and Log including status of tests performed since last QC Meeting.

f. Resolve QC and production problems. Discuss status of pending change orders.

g. Address items that may require revising the QC Plan.

h. Review Accident Prevention Plan (APP) and effectiveness of the safety program.

i. Review environmental requirements and procedures.

j. Review Environmental Management Plan.

k. Review Waste Management Plan.

1. Review the status of training completion.

m. Review Cx Plan and progress. Review Issues Log and resolution.

n. Review IAQ Management Plan.

1.5.2 Contractor Quality Control {CQC) Plan

Submit no later than 30 days after receipt of notice to proceed, the CQC Plan proposed to implement the requirements RFO 52.246-12 Inspection of Construction. The Government will consider an interim plan for the first 60 days of operation. Design and Construction will be permitted to begin only after acceptance of the CQC Plan and other Contract requirements or

acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional work. Design work is not permitted to start prior to approval of a Design Quality Control Plan.

1.5.2.1 Content of Contractor Quality Control (CQC) Plan

Provide a CQC Plan, prior to start of construction that includes a table of contents, with major sections identified, pages numbered sequentially, and that documents the proposed methods and responsibilities for accomplishing quality control during the construction of the project. The CQC Plan must at a minimum include the following sections:

a. A description of the quality control organization and acknowledgment that the CQC staff will implement the three phase control system for all aspects of the work specified.

b. An organizational chart showing the quality control organization with individual names and job titles and lines of authority up to an executive of the company at the home office.

c. NAMES AND QUALIFICATIONS: Names and qualifications, in resume format, (including position titles and durations for qualifying experiences) for each person in the QC organization. Include the Construction Quality Management (CQM) for Contractors course certifications for the QC personnel as required by the paragraph CONSTRUCTION QUALITY MANAGEMENT TRAINING.

d. DUTIES, RESPONSIBILITY AND AUTHORITY OF QC PERSONNEL: Duties, responsibilities, and authorities of each person in the QC organization.

e. OUTSIDE ORGANIZATIONS: A listing of outside organizations, such as architectural and consulting engineering firms, that will be employed by the Contractor and a description of the services these firms will provide.

f. APPOINTMENT LETTERS: Letters signed by an officer of the firm appointing the QC Manager and Alternate QC Manager, Design Quality Control Manager, CxC, and stating that they are responsible for implementing and managing the QC program as described in this Contract. Include in this letter the responsibility of the QC Manager and Alternate QC Manager to implement and manage the three phases of control, and their authority to stop work that is not in compliance with the Contract. Letters of direction are to be issued by the QC Manager to all other QC Specialists or quality control representatives outlining their duties, authorities, and responsibilities. Include copies of the letters in the QC Plan.

g. SUBMITTAL PROCEDURES AND INITIAL SUBMITTAL REGISTER: Procedures for reviewing, approving, scheduling, and managing submittals, including those of subcontractors, designers of record, consultants, architect-engineers (AE), offsite fabricators, suppliers, and purchasing agents. Provide the name(s) of the person(s) in the QC organization authorized to review and certify submittals prior to approval. Provide the initial submittal of the Submittal Register as specified in Section 01 33 00 SUBMITTAL PROCEDURES.

h. TESTING LABORATORY INFORMATION: Testing laboratory information

required by the paragraph ACCREDITATION REQUIREMENTS, as applicable.

i. TESTING PLAN AND LOG: A Testing Plan and Log that includes the tests required, associated feature of work required, referenced by the specification paragraph number requiring the test, the frequency, and the person responsible for each test.

j. Procedures to complete design and construction deficiencies from identification through acceptable corrective action. Establish verification procedures that identified deficiencies have been corrected. This phase is performed prior to beginning work on each definable feature of work, after all required plans, documents, materials are approved, and after copies are at the work site.

k. Reporting procedures, including proposed reporting formats.

1. Procedures for submitting and reviewing design changes/variations prior to submission to the Contracting Officer.

m. LIST OF DEFINABLE FEATURES: A Definable Feature of Work (DFOW) is a task that is separate and distinct from other tasks and has control requirements and work crews unique to that task. A DFOW is identified by different trades or disciplines, or it is work by the same trade in a different environment. A DFOW is by definition any item or activity on the construction schedule, and the schedule specification provides direction regarding how the DFOWs are to be structured. Include in the list of DFOWs for all activities on the Construction Schedule. Provide separate DFOWs in the Network Analysis Schedule for each design development stage and submittal package. Although each section of the specifications can generally be considered as a definable feature of work, there are frequently more than one definable features under a particular section. Identify the specification section number and schedule activity ID for each DFOW listed. The DFOW list will be reviewed in coordination with the construction schedule and agreed upon during the Coordination and Mutual Understanding Meeting.

n. PROCEDURES FOR PERFORMING AND TRACKING THE THREE PHASES OF CONTROL: Identify procedures used to ensure the three phases of control to manage the quality on this project. For each Definable Feature of Work (DFOW), a Preparatory and Initial phase checklist will be filled out during the Preparatory and Initial phase meetings. Conduct the Preparatory and Initial Phases and meetings with a view towards obtaining quality construction by planning ahead and identifying potential problems for each DFOW.

o. Coordinate scheduled work with Special Inspections required by Section 01 45 35 SPECIAL INSPECTIONS, the Statement of Special Inspections and the Special Inspections Project Manual. Where the applicable code issued by the International Code Council (ICC) calls for inspections by the Building Official, the Contractor must include the inspections in the Quality Control Plan and must perform the inspections required by the applicable ICC. The Contractor must perform these inspections using independent qualified inspectors. Include the Special Inspections Project Manual requirements in the QC Plan.

p. PROCEDURES FOR COMPLETION INSPECTION: Procedures for identifying and documenting the completion inspection process. Include in these procedures the responsible party for punch out inspection, pre-final inspection, and final acceptance inspection.

q. TRAINING PROCEDURES AND TRAINING LOG: Procedures for coordinating and documenting the training of personnel required by the Contract.

r. ORGANIZATION AND PERSONNEL CERTIFICATIONS LOG: Procedures for coordinating, tracking and documenting all certifications required for entities such as subcontractors, testing laboratories, suppliers, and personnel. The QC Manager will ensure that certifications are current, appropriate for the work being performed, and will not lapse during any period of the Contract that the work is being performed.

1.5.2.2 Additional Requirements for Design Quality Control (DQC) Plan

The following additional requirements apply to the DQC Plan:

a. Submit and maintain a DQC Plan as an effective quality control program which assures that all services required by this Contract are performed and provided in a manner that meets professional architectural and engineering quality standards. As a minimum, all documents must be technically reviewed by competent, independent reviewers identified in the DQC Plan. The same element that produced the product may not perform the Independent Technical Review (ITR). Correct errors and deficiencies in the design documents prior to submitting them to the Government.

b. Include the design schedule in the master project schedule, showing the sequence of events involved in carrying out the project design tasks within the specific Contract period. Schedule must include sufficient detail to identify all major design tasks, including those that control the flow of work. Include review and correction periods associated with each item. Schedule must be a forward planning as well as a project monitoring tool. The schedule reflects calendar days and not dates for each activity. If the schedule is changed, submit a revised schedule reflecting the change within 7 calendar days.

c. Include in the DQC Plan the discipline-specific checklists to be used during the design and quality control of each submittal. Submit at each design phase as part of the project documentation these completed discipline-specific checklists. ER 1110-3-12 provides some useful information in developing checklists.

d. Implement the DQC Plan by a Design Quality Control Manager who has the responsibility of being cognizant of and assuring that all documents on the project have been coordinated and who coordinates work with and reports to the Contracting Officer via the QC Manager. Notify the Contracting Officer, in writing, of the name of the individual and the name of an alternate person assigned to the position.

e. Provide Quality Control Documentation procedures such as QC review sets and QC comments to demonstrate that cross checking of all engineering disciple's design drawings and specifications has taken place. The QC review documentation must exhibit a checking process of the design documents for completeness, accuracy, and constructability.

1.5.3 Acceptance of the Quality Control (QC) and Design Quality Control Plan

The Contracting Officer's acceptance of the Contractor QC Plan, or interim plan applicable to the particular feature of work to be started, and Design Quality Control Plan is required prior to the start of design and

construction. Work outside of the accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional work. The Contracting Officer reserves the right to require changes in the QC and DQC Plan and operations as necessary, including removal or addition of personnel, to ensure the specified quality of work. The Contracting Officer reserves the right to interview any member of the QC and DQC organization at any time to verify the submitted qualifications. All QC and DQC organization personnel are subject to acceptance by the Contracting Officer. The Contracting Officer may require the removal of any individual for non-compliance with quality requirements specified in the Contract.

1.5.4 Notification of Changes

Notify the Contracting Officer, in writing, of any proposed changes in the QC Plan or changes to the QC organization personnel. Proposed changes are subject to acceptance by the Contracting Officer.

1.5.5 Special Inspections

Perform all required Special Inspections per Section 01 45 35 SPECIAL INSPECTIONS, the statement of Special Inspections and the Schedule of Special Inspections.

1.6 QUALITY CONTROL (QC) ORGANIZATION

1.6.1 Personnel Requirements

The requirements for the CQC organization are a Site Safety and Health Officer (SSHO), QC Manager, a Design Quality Manager, and enough qualified personnel to ensure safety and Contract compliance. The SSHO reports directly to a senior project (or corporate) official independent from the QC Manager. The SSHO will also serve as a member of the CQC Staff Personnel identified in the technical provisions as requiring specialized skills to assure the required work is being performed properly. The CQC staff always maintains a presence at the site during progress of the work and have complete authority and responsibility to take any action necessary to ensure Contract compliance. The CQC staff will be subject to acceptance by the Contracting Officer. Provide adequate office space, filing systems and other resources as necessary to maintain an effective and fully functional CQC organization. Promptly complete and furnish all letters, material submittals, shop drawing submittals, schedules, and all other project documentation to the CQC organization. The CQC organization is responsible for always maintaining these documents and records at the site, except as otherwise acceptable to the Contracting Officer.

1.6.2 Quality Control (QC) Manager

1.6.2.1 Duties

Provide a QC Manager at the work site to implement and manage the QC program. The QC Manager must be employed by the Prime Contractor. The only duties and responsibilities of the QC Manager are to manage and implement the QC program on this Contract. The QC Manager must attend the Coordination and Mutual Understanding Meeting, perform the three phases of control except for those phases of control designated to be performed by QC Specialists, perform submittal review and approval, ensure testing is performed and provide QC certifications and documentation required in this Contract. The QC Manager is responsible for managing and coordinating the

three phases of control and documentation performed by the QC Specialists, testing laboratory personnel and any other inspection and testing personnel required by this Contract. The QC Manager is the manager of all QC activities. The QC manager is responsible for notifying the Special Inspector of activities which require their review. The QC manager is responsible for coordinating the Special Inspection activities, see paragraph CONTRACTOR'S QUALITY CONTROL (QC) MANAGER, in Section 01 45 35 SPECIAL INSPECTIONS. The QC manager is responsible for the quality control for Secure Space Controlled Area Sound Rated, and perimeter construction.

1.6.2.2 Qualifications

The QC Manager must be an individual with a minimum of 10 years combined experience in the following positions: Project Superintendent, QC Manager, Project Manager, Project Engineer or Construction Manager on similar size and type construction Contracts which included the major trades that are part of this Contract. The individual must have at least 2 years experience as a QC Manager. The individual must be familiar with the requirements of EM 385-1-1 and have experience in the areas of hazard identification, safety compliance, and sustainability.

The QC Manager and all members of the QC organization must be capable of reading, writing, and conversing fluently in the English language.

1.6.2.3 Construction Quality Management Training

In addition to the above experience and education requirements, the QC Manager Alternate QC Manager, Superintendent, QC Specialist, and DQCM must have completed the CQM for Contractors course. If the QC Manager does not have a current certification, obtain the CQM for Contractors course certification within 90 days of award. This course is periodically offered by the Army Corps of Engineers. Contact the Contracting Officer for information on the next scheduled class.

The Construction Quality Management Training certificate expires after 5 years. If the QC Manager's certificate has expired, retake the course to remain current.

1.6.3 Organizational Changes

Maintain the QC staff with personnel as required by the specification section at all times. When it is necessary to make changes to the QC staff, revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.

1.6.4 Design Quality Control (DQC) Manager

The DQC Manager must be a member of the QC organization, must coordinate actions with the QC Manager, and must not be subordinate to the Project Superintendent or the Project Manager. The DQC Manager may also act as the CxC if all CxC qualifications are met.

1.6.4.1 Qualifications

a. Must be a person who has verifiable engineering or architectural design experience and is a registered professional engineer or architect.

1.6.4.2 Responsibilities

a. Be responsible for the design integrity, professional design standards, and all design services required.

1.6.5 Alternate Quality Control (QC) Manager Duties and Qualifications

Designate an alternate for the QC Manager at the work site to serve in the event of the designated QC Manager's absence. The qualification requirements for the Alternate QC Manager must be the same as for the QC Manager.

1.6.6 Assistant Quality Control (QC) Manager Duties and Qualifications

Provide a full-time assistant to the QC Manager at the work site to perform the three phases of control, perform submittal review, ensure testing is performed, and prepare QC certifications and documentation required by this Contract. The qualification requirements for the Assistant QC Manager must be on the work site during supplemental work shifts beyond the regular shift and perform duties of the QC Manager during such supplemental shift work. The individual must be familiar with the requirements of EM 385-1-1 and have experience in the areas of hazard identification and safety compliance.

The Assistant QC Manager must be capable of reading, writing, and conversing fluently in the English language.

1.6.7 Commissioning

Commissioning (Cx) is a systematic, quality-focused process for delivery of a project focusing on verifying and documenting all commissioned systems and assemblies are installed, tested, and operating as they were planned and designed to meet the project requirements. The Quality Control requirements outlined in this specification section are key in supporting the objectives of the Cx process, specifically coordinating testing, documenting, and verifying proper system operation. Properly executed the Quality Control support of Cx ensures timely execution of necessary tasks to deliver the fully commissioned and operating systems in coordination with the overall construction and project schedule.

Provide Cx in addition to the quality control requirements of this section and not as a substitute for quality control requirements. The QC Manager is responsible for carrying out the three phases of control while ensuring the functional performance and integrated systems tests are coordinated with the Cx provider as required for each system to be commissioned.

1.6.7.1 Certificate of Readiness

The QC Manager must issue a Certificate of Readiness for Government approval for each system to be commissioned. Schedule Functional Performance Tests for each system only after the Certificate of Readiness has been approved by the Government for the system. The Certificate of Readiness certifies that all required inspections have been completed and deficiencies that were identified through any prior review, inspection, or test activity have been corrected before the start of Functional Performance Tests. Refer to Cx requirements in Section 01 91 00.15 BUILDING COMMISSIONING for a list of systems to be commissioned and detailed requirements for the Cx provider.

1.6.8 Quality Control (QC) Specialists

Provide a separate QC Specialist at the work site for each of the areas as listed in the Matrix listed below, who must assist and report to the QC Manager and who may perform production related duties but must be allowed sufficient time to perform their assigned quality control duties. These individuals or specialized technical companies are directly employed by the Prime Contractor and cannot be employed by a supplier or subcontractor on this project. A single person can cover more than one area provided that the single person is qualified to perform quality control activities in each designated and that workload allows. QC Specialists must be physically present at the work site with frequency as indicated in the Experience Matrix below, to participate in the QC Meetings, perform the three phases of control, including participation in Preparatory and Initial Phase meetings, and to perform and document Follow-up inspections as an extension of the QC Manager for each definable feature of work in their area of responsibility. QC Specialist must assist and be present for training events, and Critical System Acceptance inspections by the Government. Qualification, experience, Area of Responsibility, and frequency of QC surveillance are provided in Matrix listed herein.
Following are the additional definitions for Periodic - Personnel who are intermittently present where the work to be inspected has been or is being performed.
Continuous - Constant monitoring of identified tasks by identified personnel over the duration of performance of said tasks.

Experience Matrix		
1. Area	**2-1. Qualification** **2-2. Experience**	**3-1. Area of Responsibility**
Civil	2-1. Graduate Civil Engineer or Construction Manager 2-2. 2 years experience in the type of work being performed on this project or technician with 5 years related experience	3-1. Area of Responsibility: EARTHWORK, GRADING, UTILITIES 3-2. Frequency of QC surveillance and inspection will be CONTINUOUS during installation and including final
Mechanical	2-1. Graduate Mechanical Engineer with, and 2-2. 2 years experience or person with 5 years of experience supervising mechanical features of work in the field with a construction company	3-1. Area of Responsibility: MECHANICAL, PLUMBING 3-2. Frequency of QC surveillance and inspection will be PERIODIC during installation and including final
Electrical	2-1. Graduate Electrical Engineer with 2-2. 2 years related experience or person 5 years of experience supervising electrical features of work in the field with a construction company	3-1. Area of Responsibility: ELECTRICAL 3-2. Frequency of QC surveillance and inspection will be PERIODIC during installation and including final

Structural	2-1. Graduate Civil Engineer 2-2. 2 years experience or person 5 years of experience supervising structural features of work in the field with a construction company	3-1. Area of Responsibility: STRUCTURAL 3-2. Frequency of QC surveillance and inspection will be CONTINUOUS during installation and including final
Architectural	Graduate Architect with 2 years experience or person with 5 years related experience	3-1. Area of Responsibility: ARCHITECTURAL 3-2. Frequency of QC surveillance and inspection will be PERIODIC during installation and including final
Environmental	Graduate Environmental Engineer with 3 years experience	3-1. Area of Responsibility: ENVIRONMENTAL 3-2. Frequency of QC surveillance and inspection will be PERIODIC during installation and including final
Submittals	Submittal Clerk 1 year experience	3-1. Area of Responsibility: PROJECT SUBMITTALS 3-2. Frequency of QC surveillance and inspection will be CONTINUOUS during installation and including final
Concrete, Pavements and Soils	2-1. Materials Technician 2-2. 2 years experience for the appropriate area	3-1. Area of Responsibility: CONCRETE AND SOILS 3-2. Frequency of QC surveillance and inspection will be CONTINUOUS during installation and including final
Testing, Adjusting and Balancing (TAB) Personnel	2.1. TAB Team Field Leader must be a member of AABC or an experienced technician of the firm certified by the NEBB 2-2. 3 years experience immediately preceding this Contract	3-1. Area of Responsibility: ALL TESTING 3-2. Frequency of QC surveillance and inspection will be CONTINUOUS during installation and including final

Roofing Manufacturer's Technical Representative	2-1. Installation and testing of roofing systems, 2-2. 5 years experience minimum	3-1. Area of Responsibility: ROOFING SYSTEMS 3-2. Frequency of QC surveillance and inspection will be CONTINUOUS during installation and including final
Mechanical Inspector, International Code Council (ICC) Certified	2-1. Installation and testing of boilers 2-2. 5 years experience minimum	3-1. Area of Responsibility: MECHANICAL SYSTEMS 3-2. Frequency of QC surveillance and inspection will be Minimum three times a week during installation and CONTINUOUS during testing during installation and including final
Geotechnical	2-1. Graduate geotechnical engineer 2-2. 5 years of experience	3-1. Area of Responsibility: SOILS AND FOUNDATION SYSTEMS 3-2. Frequency of QC surveillance and inspection will be CONTINUOUS during installation and including final
Low-Voltage Specialties/ESS		3-1. Area of Responsibility: LOW VOLTAGE SYTEMS 3-2. Frequency of QC surveillance and inspection will be PERIODIC during installation and includin final
Fire Protection QC Specialist (FPQC)	Note: See paragraph FIRE PROTECTION QC SPECIALIST (FPQC)	Note: See paragraph FIRE PROTECTION QC SPECIALIST (FPQC)
Building Envelope QC Specialist	2-1. Roofing Manufacturer's Technical Representative 2-2. 5 years minimum with roofing system used	3-1. Area of Responsibility: Installation and testing of roofing. 3-2. Frequency of QC surveillance and inspection will be once a week during installation, once a week during flashing installation and CONTINUOUS during roof testing.

1.6.8.1 Fire Protection QC Specialist (FPQC)

Provide a Fire Protection Quality Control Specialist (FPQC) within the QC organization to perform quality control related activities as specified herein on fire protection and life safety systems installed under this Contract.

1.6.8.1.1 Qualifications

The FPQC must have the following qualifications:

1.6.8.1.1.1 Be a registered Professional Engineer (P.E.) licensed by a Licensing Board in the United States, the District of Columbia, Guam or Puerto Rico, having passed the National Council of Examiners for Engineering and Surveying (NCEES) examination specifically in the discipline of Fire Protection Engineering.

1.6.8.1.1.2 Have a minimum of 5 years of Fire Protection Engineering experience on projects of similar relevance and complexity to the fire protection work specified under this Contract.

1.6.8.1.1.3 Other than the contractual obligations with the Prime Contractor, the FPQC must have no other business relationship (i.e., employee, owner, partner, operating officer, distributor, salesman, technical representative, family relationship, or financial investment) with the Prime Contractor or subcontractors.

1.6.8.1.1.4 Be employed by an independent engineering firm or company or be the Fire Protection Engineer on the Prime Contractor's Design-Build team. The firm may identify multiple, to a maximum of five, licensed Fire Protection Engineers for the performance of the duties under this Contract but must submit the names and qualifications for Government approval for all individuals identified prior to them performing any work under this Contract. These individuals may not be substituted without prior approval from the Contracting Officer.

1.6.8.1.2 Responsibilities

FPQC duties and responsibilities:

1.6.8.1.2.1 Assist in the development of the QC Plan including the Testing Plan and Log and executing the three phases of control for work involving the installation and testing of fire protection and life safety systems as an extension of the QC Manager.

1.6.8.1.2.2 Participate in project QC Meetings. Participate in Preparatory and Initial Phase meetings and perform and Follow-up inspections for work involving the installation and testing of fire protection and life safety systems.

1.6.8.1.2.3 Review and certify that all submittals pertaining to fire protection and life safety systems are complete and accurate prior to submission to the Government for surveillance. Forward each submittal reviewed by the FPQC to the Government for surveillance within 10 working days of FPQC certification. The FPQC Specialist is responsible for ensuring submittals are complete and accurate and all corrections have been made prior to submission to the Government. The Government reserves the right to reject any submittal that has not first been reviewed and certified by the FPQC and so marked, in writing, attesting to such

review and completeness of the submittal.

1.6.8.1.2.4 The Government reserves the right to reject any submittal or construction that is not in compliance to Contract. Government reviews do not relieve the Contractor responsibility for providing adequate quality control measures and do not constitute or imply acceptance of Contract variation.

1.6.8.1.2.5 Perform construction surveillance in accordance with the Schedule of Fire Protection System Inspections. Construction surveillance includes but is not limited to performing periodic on-site inspections during construction at specified milestones, performing a pre-final inspection of installed systems and witnessing functional testing; and participating and documenting in an on-site final acceptance inspection of fire protection and life safety systems with the Government FPE.

1.6.8.1.2.6 Document inspection results on a FPQC report prepared each day inspections are performed. The report must include a description of the visual inspection or observation performed, a written summary of findings, a conclusion on compliance with the Contract documents, and signature of the FPQC Specialist. In person inspection and Remote inspections must be documented via video (.mp4) or photo (.jpeg) or both. Video/photographic documentation must include before and after conditions and physical measurements. Forward the FPQC daily report to the QC Manager who must include the report with the submission of their daily QC Report to the Government each day. Every site visit by the FPQC must be documented on a FPQC daily report.

1.6.8.1.3 Schedule of Fire Protection System Inspections

A schedule, prepared by the Fire Protection DOR, which lists each of the required visual inspections and observations required by the FPQC. The schedule is included at the end of this UFGS section.

1.6.8.2 Quality Control (QC) for Secure Space, Controlled Area, Sound Rated Perimeter Construction

1.6.8.2.1 Periodic (Follow-Up Phase) Inspections

Once construction begins, perform periodic inspections of Secure Space, Controlled Area identified in the Contract drawings at least once every 2 weeks. Increase frequency to weekly inspections within 30 days of planned acceptance testing. Coordinate periodic inspections with the appointed Government Site Security Manager (SSM) responsible for ensuring the assembly meets the requirements for accreditation. Inspections must verify that construction and materials comply with the Contract documents, the description of the assembly in the ASTM E90 Factory Report for acoustical testing, and the approved submittals. Focus inspections on the construction of the sound rated assemblies, perimeter penetrations, perimeter doors, electronic security system, man-bar installation, inspection ports, and TEMPEST countermeasures. Document periodic inspections in Daily QC Reports.

1.6.8.2.2 Preliminary Inspection

The Government and QC Manager will perform a joint preliminary inspection of the Secure Space, Controlled Area after construction of the assembly is complete to verify compliance with the design requirements and other Contract documents. The Contracting Officer and the appointed Government

SSM will participate in the preliminary inspection. Provide the Contracting Officer a minimum 14 calendar days notification in advance of the preliminary inspection.

As a result of the preliminary inspection, prepare a Secure Space Controlled Area punch list with deficiencies identified. Include with the punch list the estimated date by which the deficiencies will be corrected. Document the preliminary inspection in the Daily QC Report and attach the punch list. Notify the Contacting Officer when deficiencies are corrected. Deficiencies from the Preliminary Inspection must be corrected prior to scheduling the Final Acceptance Inspection.

1.6.8.2.3 Acceptance Testing for Sound Attenuation

Perform acceptance testing for sound transmission loss of sound rated door assemblies. Acceptance testing must be performed during the preliminary inspection. The Contracting Officer and the appointed Government SSM must witness acceptance testing. Deficiencies identified during acceptance testing must be included in the Secure Space, Controlled Area punch list and corrected prior to the final acceptance inspection.

1.6.8.2.4 Acceptance Testing for Electronic Security Systems

Perform acceptance testing for Electronic Security Systems. Acceptance testing must be performed during the preliminary inspection. The Contracting Officer and the appointed Government SSM must witness acceptance testing. Deficiencies identified during acceptance testing must be included in the Secure Space, Controlled Area punch list and corrected prior to the Final Inspection. Request a final inspection by the Contracting Officer a minimum of 14 calendar days in advance.

1.6.8.2.5 Final Inspection

Perform a final inspection of the Secure Space, Controlled Area after required testing has been successfully completed as part of the preliminary inspection and all punch list items corrected. Testing is not permitted during the final inspection. QC Manager and Superintendent must attend the final inspection and Government attendees will include the Contracting Officer and appointed Government SSM. Request a final inspection by the Contracting Officer a minimum of 14 calendar days in advance.

1.6.9 Submittal Reviewers Duties and Qualifications

Provide a Submittal Reviewers, other than the QC Manager or CxC, qualified in the disciplines being reviewed, to review and certify that the submittals meet the requirements of this Contract prior to certification or approval by the QC Manager.

Each submittal must be reviewed by an individual with 10 years of construction experience.

Each submittal must be reviewed by a registered architect or professional engineer.

1.7 SUBMITTAL AND DELIVERABLES REVIEW AND APPROVAL

Procedures for submission, review and approval of submittals are described in Section 01 33 00 SUBMITTAL PROCEDURES. Procedures must include field verification of relevant dimensions and component characteristics by the QC organization prior to submittal being sent to the Contracting Officer. The

CQC organization is responsible for certifying that all submittals and deliverables are in compliance with the Contract. When Section 01 91 00.15 BUILDING COMMISSIONING are included in the Contract, the submittals required by those sections have to be coordinated with Section 01 33 00 SUBMITTAL PROCEDURES to ensure adequate time is allowed for each type of submittal required.

1.8 THREE PHASES OF CONTROL

CQC enables the Contractor to ensure that the construction, including that of subcontractors and suppliers, complies with the requirements of the Contract. At least three phases of control must be conducted by the QC Manager to adequately cover both on-site and off-site work for each definable feature of the construction work as follows:

1.8.1 Preparatory Phase

Document the results of the preparatory phase actions by separate minutes prepared by the QC Manager and attach to the daily CQC report. Instruct applicable workers as to the acceptable level of workmanship required to meet Contract specifications.

Notify the Contracting Officer at least 2 business days in advance of each preparatory phase meeting. The meeting **will** be conducted by the QC Manager and attended by the QC Specialists, the Project Superintendent, the CxC, the Special Inspector, the Special Inspector of Record, and the foreman responsible for the DFOW. When the DFOW will be accomplished by a subcontractor, that subcontractor's foreman must attend the preparatory phase meeting. This phase is performed prior to beginning work on each definable feature of work, after **all** required plans/documents/materials are approved/accepted, and after copies are at the work site. Perform the following prior to beginning work on each DFOW:

a. Review each paragraph of the applicable specification sections, reference codes, and standards. Make available during the prepatory inspection a copy of those sections of referenced codes and standards applicable to that portion of the work to be accomplished in the field. Maintain and make available in the field for use by Government personnel until final acceptance of the work.

b. Review the Contract drawings.

c. Verify that field measurements are as indicated on construction or shop drawings or both before confirming product orders, to minimize waste due to excessive materials.

d. Verify that appropriate shop drawings and submittals for materials and equipment have been submitted and approved. Verify receipt of approved factory test results, when required.

e. Review the testing plan and ensure that provisions have been made to provide the required QC testing.

f. Examine the work area to ensure that the required preliminary work has been completed and complies with the Contract and ensure any deficiencies/rework items in the preliminary work have been corrected and confirmed by the Contracting Officer.

g. Review coordination of product/material delivery to designated prepared

areas to execute the work.

h. Examine the required materials, equipment and sample work to ensure that they are on hand and conform to the approved shop drawings and submitted data and are properly stored.

i. Check to assure that all materials and equipment have been tested, submitted, and approved.

j. Discuss specific controls to be used, construction methods, construction tolerances, workmanship standards, and the approach that will be used to provide quality construction by planning ahead and identifying potential problems for each DFOW. Ensure any portion of the plan requiring separate Contracting Officer acceptance has been approved.

k. Review the APP and appropriate Activity Hazard Analysis (AHA) to ensure that applicable safety requirements are met, and that required Safety Data Sheets (SDS) are submitted.

l. Review the Cx requirements in accordance with Section 01 91 00.15 BUILDING COMMISSIONING and ensure all preliminary work items have been completed and documented.

m. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.

n. Discuss schedule and execution of the initial control phase and confirmation or construction quality compliance.

o. Review Special Inspections required by Section 01 45 35 SPECIAL INSPECTION, the Statement of Special Inspections and the Schedule of Special Inspections.

1.8.2 Initial Phase

Notify the Contracting Officer at least 2 business days in advance of each initial phase. When construction crews are ready to start work on a DFOW, conduct the initial phase with the QC Specialists, the Project Superintendent, the Special Inspector, the Special Inspector of Record, and the foreman responsible for that DFOW. Observe the initial segment of the DFOW to ensure that the work complies with Contract requirements. Document the results of the initial phase in the daily CQC Report and in the Initial Phase Checklist. Repeat the initial phase for each new crew to work on-site when acceptable levels of specified quality are not being met. Indicate the exact location of initial phase for definable feature of work for future reference and comparison with follow-up phases. Perform the following for each DFOW:

a. Check work to ensure that it is in full compliance with Contract requirements. Review minutes of the preparatory meeting.

b. Verify adequacy of controls to ensure full Contract compliance. Verify required control inspection and testing comply with the Contract.

c. Establish level of workmanship and verify that it meets the minimum acceptable workmanship standards. Compare with required sample panels as appropriate.

d. Resolve any workmanship issues.

e. Ensure that testing is performed by the approved laboratory.

f. Check work procedures for compliance with the APP and the appropriate AHA to ensure that applicable safety requirements are met.

g. Review project specific work plans (i.e., ex, HAZMAT Abatement, Stormwater Management) to ensure all preparatory work items have been completed and documented.

h. Coordinate scheduled work with Special Inspections required by Section 01 45 35 SPECIAL INSPECTIONS, the Statement of Special Inspections and the Schedule of Special Inspections.

1.8.3 Follow-Up Phase

Perform the following for on-going DFOW daily, or more frequently as necessary, until the completion of each DFOW. The Final Follow-Up for any DFOW will clearly note in the daily report the DFOW is completed, and all deficiencies/rework items have been completed in accordance with the paragraph DEFICIENCY/REWORK ITEMS LIST. Each DFOW that has completed the Initial Phase and has not completed the Final Follow-up must be included on each daily report. If no work was performed on that DFOW for the period of that daily report, it must be so noted. Document all Follow-Up activities for DFOWs in the daily CQC Report:

a. Ensure the work including control testing complies with Contract requirements until completion of that particular work feature. Record checks in the CQC documentation.

b. Maintain the quality of workmanship required.

c. Ensure that testing is performed by the approved laboratory.

d. Ensure that deficiencies/rework items are being corrected. Conduct final follow-up checks and correct all deficiencies prior to the start of additional features of work which may be affected by the deficient work.

e. Do not build upon nor conceal non-conforming work.

f. Assure manufacturers' representatives have performed necessary inspections if required and perform safety inspections.

g. Review the Cx requirements in accordance with Section 01 91 00.15 BUILDING COMMISSIONING.

h. Coordinate scheduled work with Special Inspections required by Section 01 45 35 SPECIAL INSPECTIONS, the Statement of Special Inspections and the Schedule of Special Inspections.

1.8.4 Additional Preparatory and Initial Phases

Conduct additional preparatory and initial phases on the same DFOW if the quality of on-going work is unacceptable, if there are changes in the applicable QC organization, if there are changes in the on-site production supervision or work crew, if work on a DFOW has not started within 45 days

of the initial preparatory meeting or has resumed after 45 days of inactivity, or if other problems develop.

1.8.5 Notification of Three Phases of Control for Off-Site Work

Notify the Contracting Officer at least 2 weeks prior to the start of the preparatory and initial phases for any work fabricated offsite that is to be incorporated into the construction.

1.8.6 Deficiency/Rework Items List

The QC Manager must maintain a list of work that does not comply with the Contract, identifying what items need to be corrected, the activity ID number associated with the item, the date the item was originally discovered, the date the item will be corrected by, and the date the item was corrected.

The QC Manager reviews the list at each weekly QC Meeting:

a. There is no requirement to report a deficiency/rework item that is corrected the same day it is discovered.

b. No successor task may be advanced beyond the preparatory phase meeting until all deficiencies/rework items have been cleared by the QC Manager and concurred with by the Contracting Officer. This must be confirmed as part of the Preparatory Phase activities.

c. Attach a copy of the "Deficiency/Rework Items List" to the last daily CQC Report of each month.

d. The Contractor is responsible for including those items identified by the Contracting Officer.

e. All deficiencies/rework items must be confirmed as corrected by the QC Manager, and concurred by the Contracting Officer, prior to commencement of any completion inspections per paragraph COMPLETION INSPECTIONS unless specifically exempted by the Contracting Officer.

f. Non-Compliance with these requirements is grounds for removal in accordance with paragraph ACCEPTANCE OF THE QUALITY CONTROL {QC) and DESIGN QUALITY CONTROL {DQC) PLAN.

g. All delays, concurrent or related to failure to manage, monitor, control, and correct deficiencies/rework items are entirely the responsibility of the Contractor and can not be made the subject, or any component of any request for additional time or compensation.

1.9 TESTING

Perform specified or required tests to verify that control measures are adequate to provide a product which conforms to Contract requirements. Upon request, furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and acceptance tests when specified. Procure the services of an U.S. Army Corps of Engineers approved testing laboratory or establish an approved testing laboratory at the project site or within 10 miles. Perform the following activities and record and provide the following data:

a. Verify that testing procedures comply with Contract requirements.

b. Verify that facilities and testing equipment are available and comply with testing standards.

c. Check test instrument calibration data against certified standards.

d. Verify that recording forms and test identification control number system, including all test documentation requirements, have been prepared.

e. Record results of all tests taken, both passing and failing on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test. If approved by the Contracting Officer, actual test reports are submitted later with a reference to the test number and date taken. Provide an information copy of tests performed by an offsite or commercial test facility directly to the Contracting Officer. Failure to submit timely test reports as stated results in nonpayment for related work performed and disapproval of the test facility for this Contract.

1.9.1 Laboratory Accreditation Authorities

All testing laboratories must be validated by the USACE Material Testing Center (MTC) for the tests to be performed. Information on the USACE MTC with web-links to both a list of validated testing laboratories and for the laboratory inspection request for can be found at: https://mtc.erdc.dren.mil

1.9.2 Capability Check

The Contracting Officer retains the right to check laboratory equipment in the proposed laboratory and the laboratory technician's testing procedures, techniques, and other items pertinent to testing, for compliance with the standards set forth in this Contract. Laboratories utilized for testing soils, concrete, asphalt, and steel must meet criteria detailed in ASTM D3740 and ASTM E329.

1.9.2.1 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed a charge of $1,500 to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the Contract amount due the Contractor.

1.9.2.2 Onsite Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests, and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

1.9.3 Test Results

Cite applicable Contract requirements, tests or analytical procedures used. Provide actual results and include a statement that the item tested or analyzed conforms or fails to conform to specified requirements. If the item fails to conform, notify the Contracting Officer immediately. Conspicuously stamp the cover sheet for each report in large red letters

"CONFORMS" or "DOES NOT CONFORM'' to the specification requirements, whichever is applicable. Test results must be signed by a testing laboratory representative authorized to sign certified test reports. Furnish the signed reports, certifications, and other documentation to the Contracting Officer via the QC Manager.

1.10 COMPLETION INSPECTIONS

1.10.1 Punch-Out Inspection

Near the completion of all work or any increment thereof, established by a completion time stated in the Contract Clause entitled "Commencement, Prosecution, and Completion of Work," or stated elsewhere in the specifications, the QC Manager must conduct an inspection of the work and develop a "punch list" of items which do not conform to the approved drawings, specifications, and Contract. Include in the punch list any remaining items on the "Deficiency/Rework Items List", that were not corrected prior to the Punch-Out Inspection as approved by the Contracting Officer in accordance with the paragraph DEFICIENCY/REWORK ITEMS LIST. Include within the punch list the estimated date by which the deficiencies will be corrected. Provide a copy of the punch list to the Contracting Officer.

The QC Manager, or staff, must make follow-on inspections to ascertain that all deficiencies have been corrected. All punch list items must be confirmed as corrected by the QC Manager and concurred by the Contracting Officer. Once this is accomplished, notify the Government that the facility is ready for the Government "Pre-Final Inspection".

1.10.2 Pre-Final Inspection

The Government and QC Manager will perform this inspection to verify that the facility is complete and ready to be occupied. A Government "Pre-Final Punch List" will be documented by the QC Manager as a result of this inspection. The QC Manager will ensure that all items on this list are corrected and concurred by the Contracting Officer prior to notifying the Government that a "Final" inspection with the Client can be scheduled. All items noted on the "Pre-Final" inspection must be corrected and concurred by the Contracting Officer in a timely manner and be accomplished before the Contract completion date for the work, or any increment thereof, if the project is divided into increments by separate completion dates unless exceptions are directed by the Contracting Officer.

1.10.3 Final Acceptance Inspection

Notify the Contracting Officer at least 14 calendar days prior to the date a final acceptance inspection can be held. State within the notice that all items previously identified on the pre-final punch list will be corrected and acceptable, along with any other unfinished Contract work, by the date of the final acceptance inspection. The Contractor must be represented by the QC Manager, the Project Superintendent, and others deemed necessary. Attendees for the Government will include the Contracting Officer, other Government QA personnel, and personnel representing the Client. Failure of the Contractor to have all Contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the Contract Clause entitled "Inspection of Construction."

1.11 QUALITY CONTROL (QC) CERTIFICATIONS

1.11.1 Contractor Quality Control (CQC) Report Certification

Contain the following statement within the CQC Report: "On behalf of the Contractor, I certify that this report is complete and correct and equipment and material used, and work performed during this reporting period is in compliance with the Contract drawings and specifications to the best of my knowledge, except as noted in this report."

1.11.2 Completion Certification

Upon completion of work under this Contract, the QC Manager must furnish a certificate to the Contracting Officer attesting that "the work has been completed, inspected, tested and is in compliance with the Contract." Provide a copy of this final QC Certification for completion to the preparer of the Operation & Maintenance (O&M) documentation.

1.12 DOCUMENTATION AND INFORMATION FOR THE CONTRACTING OFFICER

Maintain current and complete records of on-site and off-site QC program operations and activities.

Contact the Contracting Officer for sample forms or print from RMS as needed. Prior to commencing work on construction, the Contractor must obtain a copy set of the current report forms. The report forms will consist of the Contractor Quality Control (CQC) Report, CQC Report (Continuation Sheet), Contractor Production Report, Contractor Production Report (Continuation Sheet), Preparatory Phase Checklist, Initial Phase Checklist, Testing Plan and Log, and Rework Items List. Unless otherwise provided by the Contracting Officer, Contractor may use the forms provided as related material located at www.wbdg.org/dod/ufgs/ufgs-01-45-00.

1.12.1 Construction Documentation

Prepare a Construction Production Report and a Contractor Quality Control Report for each day that work is performed. Attach the Construction Production Report to the Contractor Quality Control Report prepared for the same day. Maintain current and complete records of on-site and off-site QC program operations and activities.Account for each calendar day throughout the life of the Contract.

The Project Superintendent and the QC Manager must prepare and sign the Contractor Production and CQC Reports, respectively. Every space on the forms must be filled in. Use N/A if nothing can be reported in one of the spaces. The reporting of work must be identified by terminology consistent with the construction schedule. In the "Remarks'' sections of the reports, enter pertinent information including directions received, problems encountered during construction, work progress and delays, conflicts or errors in the drawings or specifications, field changes, safety hazards encountered, instructions given and corrective actions taken, delays encountered, a record of visitors to the work site, quality control problem areas, deviations from the QC Plan, construction deficiencies encountered, and meetings held. For each entry in the report(s), identify the Schedule Activity No. that is associated with the entered remark.

1.12.2 Quality Control Activities

CQC and Contractor Production reports will be prepared daily to maintain

current records providing factual evidence that required quality control activities and tests have been performed. Include in these records the work of subcontractors and suppliers on an acceptable form that includes, as a minimum, the following information:

a. The name and area of responsibility of the Contractors and any subcontractors.

b. Operating plant/equipment with hours worked, idle, or down for repair.

c. Work performed each day, giving location, description, and by whom. When a Network Analysis Schedule (NAS) is used, identify each item of work performed each day by NAS activity number.

d. Control phase activities performed. Preparatory, and Initial phase Checklists associated with the DFOW referenced to the construction schedule. Follow-up phase activities identified to the DFOW. If testing or specific QC Specialist activities are associated with the Follow-up phase activities for a specific DFOW note this and include those reports.

e. Test and control activities performed with results and references to specifications and drawings requirements. Identify the control phase (Preparatory, Initial, Follow-up). List of deficiencies noted, along with corrective action in accordance with the paragraph DEFICIENCY/REWORK ITEMS LIST.

f. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications and drawings requirements.

g. Submittals and deliverables reviewed, with Contract reference, by whom, and action taken.

h. Offsite surveillance activities, including actions taken.

i. Job safety evaluations stating what was checked, results, and instructions or corrective actions.

j. Instructions given/received and conflicts in plans and specifications.

k. Provide documentation of design quality control activities. For independent design reviews, provide, as a minimum, identification of the Independent Technical Review (ITR) team and their review comments, responses and the record of resolution of the comments.

1.12.3 Verification Statement

Indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. Cover both conforming and deficient features and include a statement that equipment and materials incorporated in the work and workmanship comply with the Contract.

Furnish these records in report form to the Government by 10:00 AM the next working day after the date covered by the report. As a minimum, prepare and submit one report for every 7 days of no work and on the last day of a no work period. All calendar days need to be accounted for throughout the life of the Contract. The first report

following a day of no work will be for that day only. Reports need to be signed and dated by the QC Manager. Include copies of test reports and copies of reports prepared by all subordinate quality control personnel within the QC Manager Report.

1.12.4 Reports from the Quality Control (QC) Specialist(s)

Document inspection results on a QC specialist report prepared each day work is performed in their area of responsibility. The report must include a description of the visual inspection or observation performed, a written summary of findings, a conclusion on compliance with the Contract documents, and signature of the QC Specialist. In person inspections must be documented with Video/photographs. Video/photographic documentation of deficiencies must include before and after conditions and physical measurements, as necessary. Forward the QC daily report to the QC Manager who must include the report with the submission of their daily QC Report to the Government each day. Every site visit by the QC Specialist must be documented on a QC Specialist daily report.

1.12.5 Quality Control Validation

Establish and maintain the following in an electronic folder. Divide folder into a series of tabbed sections as shown below. Ensure folder is updated at each required progress meeting.

a. CQC Meeting minutes in accordance with paragraph QUALITY CONTROL (QC) MEETINGS.

b. All completed Preparatory and Initial Phase Checklists, arranged by specification section, further sorted by DFOW referenced to the construction schedule. Submit each individual Phase Checklist the day the phase event occurs as part of the CQC daily report.

c. All milestone inspections, arranged by Activity Number referenced to the construction schedule.

d. An up-to-date copy of the Testing Plan and Log with supporting field test reports, arranged by specification section referenced to the DFOW to which individual reports results are associated. Individual field test reports will be submitted within 2 working days after the test is performed in accordance with the paragraph QUALITY CONTROL ACTIVITIES.

e. Copies of all Contract modifications, arranged in numerical order. Also include documentation that modified work was accomplished.

f. An up-to-date copy of the paragraph DEFICIENCY/REWORK ITEMS LIST.

g. Cx documentation in accordance with Section 01 91 00.15 BUILDING COMMISSIONING.

h. Special Inspection reports.

i. Upon commencement of Completion Inspections of the entire project or any defined portion, maintain up-to-date copies of all punch lists issued by the QC staff to the Contractor and subcontractors and all punch lists issued by the Government in accordance with the paragraph COMPLETION INSPECTIONS.

1.12.6 Testing Plan and Log

As tests are performed, the CxC and the QC Manager will record on the "Testing Plan and Log" the date the test was performed and the date the test results were forwarded to the Contracting Officer. Attach a copy of the updated "Testing Plan and Log" to the last daily CQC Report of each month. Provide a copy of the final "Testing Plan and Log" to the preparer of the Operation & Maintenance (O&M) documentation.

1.12.7 As-Built Drawings

The QC Manager must ensure the as-built drawings, required by Section 01 78 00 CLOSEOUT SUBMITTALS are kept current on a daily basis and marked to show deviations which have been made from the Contract drawings. The as-built drawings document commences with the QC Manager ensuring all amendments, or changes to the Contract prior to Contract award are accurately noted in the initial document set creating the accurate baseline of the Contract prior to any work starting. Ensure each deviation has been identified with the appropriate modifying documentation (e.g., PC No., Modification No., Request for Information No.). The QC Manager or QC Specialist assigned to an area of responsibility must initial each revision. Upon completion of work, the QC Manager will furnish a certificate attesting to the accuracy of the as-built drawings prior to submission to the Contracting Officer.

1.13 NOTIFICATION ON NON-COMPLIANCE

The Contracting Officer will notify the Contractor of any detected non-compliance with the Contract. Take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, is deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders will be made the subject of a claim for extension of time for excess costs or damages by the Contractor.

1.14 DELIVERY, STORAGE, AND HANDLING

Designate receiving/storage areas for incoming material to be delivered according to installation schedule and to be placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. Store and handle materials in a manner as to prevent loss from weather and other damage. Keep materials, products, and accessories covered and off the ground, and store in a dry, secure area. Prevent contact with material that may cause corrosion, discoloration, or staining. Protect all materials and installations from damage by the activities of other trades.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 45 00.15 10

RESIDENT MANAGEMENT SYSTEM CONTRACTOR MODE (RMS CM)
11/23

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this section to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2024) Safety -- Safety and Occupational Health (SOH) Requirements

1.2 MEASUREMENT AND PAYMENT

The work of this section is not measured for payment. The Contractor is responsible for the work of this section, without any direct compensation other than the payment received for contract items.

1.3 CONTRACT ADMINISTRATION

The Government will use the Resident Management System (RMS) to assist in its monitoring and administration of this contract. The Government accesses the system using the Government Mode of RMS (RMS GM) and the Contractor accesses the system using the Contractor Mode (RMS CM). The term RMS will be used in the remainder of this section for both RMS GM and RMS CM. The joint Government-Contractor use of RMS facilitates electronic exchange of information and overall management of the contract. The Contractor accesses RMS to record, maintain, input, track, and electronically share information with the Government throughout the contract period in the following areas:

Administration
Finances
Quality Control
Submittal Monitoring
Scheduling
Closeout
Import/Export of Data

The Contractor must be prepared to transition from the Resident Management System (RMS) to the new Construction Management Platform (CMP) at any time during the period of performance of this contract, once the USACE enterprise implements this change. The Contractor's obligation to transition from RMS to the CMP system is a requirement of this contract. Therefore, additional time or cost increase to complete this transition will not be considered. In the event of the transition, RMS project information will be migrated to CMP by the government and available in the CMP system. After the transition, the Contractor must utilize the CMP system to perform all contract administration functions previously required in RMS, including all areas listed above. After the transition, "RMS" and "CMP" will be synonymous for all "Resident Management System" and "RMS" references in this contract's specification. To facilitate the transition

from RMS to CMP, online training for the CMP system will be made available to the Contractor with enough time to train staff, prior to the transition occurring.

1.3.1 Correspondence and Electronic Communications

For ease and speed of communications, exchange correspondence and other documents in electronic format to the maximum extent feasible. Some documents such as correspondence, including pay requests and payrolls, may be required in paper format with original signatures. Paper documents will govern in the event of discrepancy with the electronic version. Contracting Officer will determine which documents require submission of paper copies.

1.3.2 Other Factors

Other portions of this document have a direct relationship to the reporting accomplished through RMS. Particular attention is directed to RFO 52.236-15 Schedules for Construction Contracts; RFO FAR 52.232-27 Prompt Payment for Construction Contracts; RFO 52.232-5 Payments Under Fixed-Priced Construction Contracts; Section 01 32 01.00 10 PROJECT SCHEDULE; Section 01 33 00 SUBMITTAL PROCEDURES; Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS; and Section 01 45 00 QUALITY CONTROL.

1.4 RMS SOFTWARE

RMS is a web based application. Download, install and be able to utilize the latest version of RMS within 7 calendar days of receipt of the Notice to Proceed. RMS software, user manuals, access and installation instructions, program updates and training information are available from the RMS website (https://rms.usace.army.mil). The Government and the Contractor will have different access authorities to the same contract database through RMS. The common database will be updated automatically each time a user finalizes an entry or change.

1.5 CONTRACT DATABASE - GOVERNMENT

The Government will enter the basic contract award data in RMS prior to granting the Contractor access. The Government entries into RMS will generally be related to submittal reviews, correspondence status, and Quality Assurance(QA)comments, as well as other miscellaneous administrative information.

1.6 CONTRACT DATABASE - CONTRACTOR

Contractor entries into RMS establish, maintain, and update data throughout the duration of the contract. Contractor entries generally include prime and subcontractor information, daily reports, submittals, RFI's, schedule updates and payment requests. RMS includes the ability to import attachments and export reports in many of the modules, including submittals. The Contractor responsibilities for entries in RMS typically include the following items:

1.6.1 Administration

1.6.1.1 Contractor Information

Enter all current Contractor administrative data and information into RMS within 7 calendar days of receiving access to the contract in RMS. This

includes, but is not limited to, Contractor's name, address, telephone numbers, management staff, and other required items.

1.6.1.2 Subcontractor Information

Enter all missing subcontractor administrative data and information into RMS CM within seven calendar days of receiving access to the Contract in RMS or within seven calendar days of the signing of the subcontractor agreement for agreements signed at a later date. This includes name, trade, address, phone numbers, and other required information for all subcontractors. A subcontractor is listed separately for each trade to be performed.

1.6.1.3 Correspondence

Identify all Contractor correspondence to the Government with a serial number. Prefix correspondence initiated by the Contractor's site office with [11]8[11]. Prefix letters initiated by the Contractor's home (main) office with "H". Letters are numbered starting from 0001. (e.g., H-0001 or S-0001). The Government's letters to the Contractor will be prefixed with "C" or "RFP". RMS shall be utilized for the tracking of all correspondence.

1.6.1.4 Equipment

Enter and maintain a current list of equipment planned for use or being used on the jobsite, including the most recent and planned equipment inspection dates in accordance with Section 01 45 00 QUALITY CONTROL.

1.6.1.5 Reports

Track the status of the project using the reports available in RMS. The value of these reports reflects the quality of the data input. These reports include but are not limited to the Progress Payment Request worksheet, Quality Control (QC) comments, Deficiency Tracking Log, Submittal Register Status, and Three-Phase Control worksheets in accordance with Sections 01 20 00 PRICE AND PAYMENT PROCEDURES, Section 01 32 01.00 10 PROJECT SCHEDULE, 01 33 00 SUBMITTAL PROCEDURES, and 01 45 00 QUALITY CONTROL.

1.6.1.6 Request For Information (RFI)

Create and track all Requests For Information (RFI) in the RMS Administration Module for Government review and response. Provide status at weekly progress meeting in accordance with Section 01 32 01.00 10 PROJECT SCHEDULE.

1.6.2 Finances

1.6.2.1 Pay Activity Data

Develop and enter a list of pay activities in conjunction with the project schedule in accordance with Section 01 32 01.00 10 PROJECT SCHEDULE. The sum of pay activities equals the total Contract amount, including modifications. Each pay activity must be assigned to a Contract Line Item Number (CLIN). The sum of the activities assigned to a CLIN equals the amount of each CLIN.

1.6.2.2 Payment Requests

Prepare all progress payment requests using RMS. Update the work completed under the Contract at least monthly, measured as percent or as specific quantities. After the update, generate a payment request and prompt payment certification using RMS. Submit the signed prompt payment certification and payment request as well as supporting data, either electronically or by hard copy.

1.6.3 Quality Control (QC)

Enter and track implementation of the 3-phase QC Control System, QC testing, transferred and installed property and warranties in RMS. Link each deficiency and QC test to a pay activity. Prepare daily reports, identify and track deficiencies, document progress of work, and support other Contractor QC requirements in RMS. Maintain all data on a daily basis. Ensure that RMS reflects all quality control methods, tests and actions contained within the Contractor Quality Control (CQC) Plan and Government review comments.

1.6.3.1 Quality Control (QC) Reports

The Contractor's Quality Control (QC) Daily Report in RMS is the official report. The Contractor can use other supplemental formats to record QC data, but information from any supplemental formats are to be consolidated and entered into the RMS QC Daily Report. Any supplemental information may be entered into RMS as an attachment to the report. QC Daily Reports must be finalized and signed in RMS within 24 hours after the date covered by the report.

1.6.3.2 Deficiency Tracking

Use the QC Daily Report Module to enter and track deficiencies. Deficiencies identified and entered into RMS by the Contractor or the Government will be sequentially numbered with a QC or QA prefix for tracking purposes. Enter each deficiency into RMS the same day that the deficiency is identified. Monitor, track and resolve all QC and QA entered deficiencies. A deficiency is not considered to be corrected until the Government indicates concurrence in RMS.

1.6.3.3 Three-Phase Control Meetings

Maintain scheduled and actual dates and times of preparatory and initial control meetings in RMS, and upload meeting minutes of the meetings. Worksheets for the three-phase control meetings are generated within RMS.

1.6.3.4 Labor and Equipment Hours

Enter labor and equipment exposure hours on a daily basis. Roll up the labor and equipment exposure data into a monthly exposure report.

1.6.3.5 Accident/Safety Reporting

Both the Contractor and the Government enter safety related comments in RMS as a deficiency. The Contractor must monitor, track and show resolution for safety issues in the QC Daily Report area of the RMS QC Module. In addition, follow all reporting requirements for accidents and incidents as

required in EM 385-1-1, Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS and as required by any other applicable Federal, State or local agencies.

1.6.3.6 Definable Features of Work

Enter each feature of work, as defined in the approved CQC Plan, into the RMS QC Module. A feature of work may be associated with a single or multiple pay activities, however a pay activity is only to be linked to a single feature of work.

1.6.3.7 Activity Hazard Analysis

Import activity hazard analysis electronic document files into the RMS QC Module utilizing the document package manager. Prepare activity hazard analysis in accordance with Section 01 35 26 GOVERNMENT SAFETY REQUIREMENTS.

1.6.4 Submittal Management

Enter all current submittal register data and information into RMS within seven calendar days of receiving access to the Contract in RMS. Contractor is responsible for entering Activity Numbers for each submittal item corresponding to their Schedule. The Contractor will import the information shown in the submittal register following the specification Section 01 33 00 SUBMITTAL PROCEDURES unless otherwise directed by the Contracting Officer. Group electronic submittal documents into transmittal packages to send to the Government, except very large electronic files, samples, spare parts, mock ups, color boards, or where hard copies are specifically required. Track transmittals and update the submittal register in RMS on a daily basis throughout the duration of the Contract.

Enter all submittals as listed in the approved design's submittal register within 14 calendar days of design approval for construction.

Contractor may request submittals to be added to RMS throughout the lifecycle of the project. Approval/disapproval of Contractor requests is at the discretion of the Contracting Officer. Submittals entry into RMS must be updated daily or as practical for performance of the Contract, as approved by the Contracting Officer.

1.6.5 Schedule

Enter and update the contract project schedule in RMS by either manually entering all schedule data or by importing the Standard Data Exchange Format (SDEF) file, based on the requirements in Section 01 32 01.00 10 PROJECT SCHEDULE.

1.6.6 Closeout

Closeout documents, processes and forms are managed and tracked in RMS by both the Contractor and the Government. Ensure that all closeout documents are entered, completed and documented within RMS.

1.7 IMPLEMENTATION

Use of RMS as described in the preceding paragraphs is mandatory. Ensure that sufficient resources are available to maintain contract data within the RMS system. RMS is an integral part of the Contractor's required

management of quality control.

1.8 NOTIFICATION OF NONCOMPLIANCE

Take corrective action within seven calendar days after receipt of notice of RMS non-compliance by the Contracting Officer.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

End of Section --

SECTION 01 45 35

SPECIAL INSPECTIONS
05/24

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

INTERNATIONAL CODE COUNCIL (ICC)

ICC IBC	(2024) International Building Code

U.S. DEPARTMENT OF DEFENSE (DOD)

UFC 3-301-01	(2023; with Change 6, 2026) Structural Engineering
UFC 3-301-02	(2023; with Change 1, 2025) Design of Risk Category V Structures, National Strategic Military Assets

1.2 GENERAL REQUIREMENTS

Perform Special Inspections in accordance with the Statement of Special Inspections, Schedule of Special Inspections, Chapter 17 of ICC IBC, and UFC 3-301-01. The Statement of Special Inspections and Schedule of Special Inspections are included as an attachment to this specification. Special Inspections are to be performed by an independent third party and are intended to ensure that the work of the Prime Contractor is in accordance with the Contract Documents and applicable building codes. Special inspections do not take the place of the three phases of control inspections performed by the Contractor's QC Manager or any testing and inspections required by other sections of the specifications.

1.3 DEFINITIONS

1.3.1 Continuous Special Inspections

Continuous Special Inspections is the constant monitoring of specific tasks by a special inspector. These inspections must be carried out continuously over the duration of the particular tasks.

1.3.2 Perform

Perform these tasks for each weld, fastener or bolted connection, and noted required verification.

1.3.3 Observe

Observe these items randomly during the course of each work day to insure that applicable requirements are being met. Observe these Special Inspections items on a periodic daily basis. Operations need not be delayed pending these inspections.

1.3.4 Special Inspector (SI)

A qualified person retained by the Contractor and approved by the Contracting Officer as having the competence necessary to inspect a particular type of construction requiring Special Inspections. The SI must be an independent third party hired directly by the Prime Contractor.

1.3.5 Associate Special Inspector (ASI)

A qualified person who assists the SI in performing Special Inspections but who must perform inspection under the direct supervision of the SI and who cannot perform inspections without the SI on site.

1.3.6 Third Party

A Special inspector must not be an employee of the Contractor or of any Sub-Contractor performing the work to be inspected.

1.3.7 Contracting Officer

The Government official having overall authority for administrative contracting actions. Certain contracting actions may be delegated to the Contracting Officer's Representative (COR).

1.3.8 Quality Control (QC) Manager

An individual retained by the Prime Contractor and qualified in accordance with the Section 01 45 00 QUALITY CONTROL having the overall responsibility for the Contractor's QC organization.

1.3.9 Structural Engineer of Record (SER)

A registered design professional retained by the Prime Contractor responsible for the overall design and review of submittal documents prepared by others. The SER is registered or licensed to practice their respective design profession as defined by the statutory requirements of the professional registration laws in the state in which the design professional works. The SER is also referred to as the Engineer of Record (EOR) in design documents.

1.3.10 Statement of Special Inspections (SSI)

A document developed by the SER identifying the materials, systems, components and work required to have Special Inspections. This statement is included at the end of this specification.

1.3.11 Schedule of Special Inspections (SSI)

A schedule which lists each of the required Special Inspections, the extent to which each Special Inspection is to be performed, and the required frequency for each in accordance with ICC IBC Chapter 17. This schedule is included at the end of this specification.

1.3.12 Definable Feature of Work (DFOW)

An inspection group that is separate and distinct from other inspection groups, having inspection requirements or inspectors that are unique.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Special Inspections Agency's Written NDT Practices with method and evidence of regular equipment calibration where applicable

SD-06 Test Reports

Special Inspection Daily Reports

Special Inspection Biweekly Reports

SD-07 Certificates

AISC Certified Steel Fabricator

AC472 Accreditation

Certificate of Compliance

Special Inspector Qualifications; G

Qualification Records for Nondestructive Testing Technicians

SD-11 Closeout Submittals

Interim Report of Special Inspections from each DFOW; G

Comprehensive Final Report of Special Inspections; G

Final Report of Structural Observations where required; G

1.5 SPECIAL INSPECTOR QUALIFICATIONS

Submit qualifications for each special inspector according to the following certification requirements. The Government will consider alternate equivalent certification upon request. Without written acceptance deviations to the following qualifications are not approved.

1.5.1 Steel Construction and High Strength Bolting

1.5.1.1 Special Inspector

a. ICC Structural Steel and Bolting Special Inspector certificate with one year of related experience, or

b. Registered Professional Engineer with 3 years of related experience

1.5.1.2 Associate Special Inspector

Engineer-In-Training with one year of related experience.

1.5.2 Welding Structural Steel

1.5.2.1 Special Inspector

a. ICC Structural Welding Special Inspector certificate with one year of related experience, or

b. AWS Certified Welding Inspector

1.5.2.2 Associate Special Inspector

AWS Certified Associate Welding Inspector

1.5.3 Nondestructive Testing of Welds

1.5.3.1 Special Inspector

NDT Level III Certificate

1.5.3.2 Associate Special Inspector

NDT Level II Certificate plus one year of related experience

1.5.4 Cold Formed Steel Framing

1.5.4.1 Special Inspector

a. ICC Structural Steel and Bolting Special Inspector certificate with one year of related experience, or

b. ICC Commercial Building Inspector with one year of experience, or

c. Registered Professional Engineer with 3 years related experience

1.5.4.2 Associate Special Inspector

Engineer-In-Training with one year of related experience.

1.5.5 Concrete Construction

1.5.5.1 Special Inspector

a. ICC Reinforced Concrete Special Inspector Certificate with one year of related experience, or

b. ACI Concrete Construction Special Inspector, or

c. Registered Professional Engineer with 3 years of related experience

1.5.5.2 Associate Special Inspector

a. ACI Concrete Construction Special Inspector-in-Training, or

b. Engineer-In-Training with one year of related experience

1.5.6 Prestressed Concrete Construction

1.5.6.1 Special Inspector

a. ICC Prestressed Concrete Special Inspector Certificate with one year of related experience, or

b. PCI Quality Control Technician/Inspector Level II Certificate with one year of related experience, or

c. Registered Professional Engineer with 3 years of related experience

1.5.6.2 Associate Special Inspector

a. PCI Quality Control Technician/Inspector Level I Certificate with one year of related experience, or

b. Engineer-In-Training with one year of related experience

1.5.7 Post-tensioned Concrete Construction

1.5.7.1 Special Inspector

a. PTI Level 2 Unbonded PT Inspector Certificate, or

b. Registered Professional Engineer with 3 years of related experience

1.5.7.2 Associate Special Inspector

a. PTI Level 1 Unbonded PT Inspector Certificate with one year of related experience, or

b. Engineer-In-Training with one year of related experience

1.5.8 Masonry Construction

1.5.8.1 Special Inspector

a. ICC Structural Masonry Special Inspector Certificate with one year of related experience, or

b. Registered Professional Engineer with 3 years of related experience

1.5.8.2 Associate Special Inspector

Engineer-In-Training with one year of related experience.

1.5.9 Wood

1.5.9.1 Special Inspector

a. ICC Commercial Building Inspector Certificate with one year of related experience, or

b. ICC Residential Building Inspector with one year of experience, or

c. Registered Professional Engineer with 3 years of related experience

1.5.9.2 Associate Special Inspector

Engineer-In-Training with one year of related experience.

1.5.10 Verification of Site Soil Condition, Fill Placement and Load-Bearing Requirements

1.5.10.1 Special Inspector

a. ICC Soils Special Inspector Certificate with one year of related experience, or

b. National Institute for Certification in Engineering Technologies (NICET) Soils Technician Level II Certificate in Construction Material Testing, or

c. Geologist-In-Training with 3 years of related experience, or

d. Registered Professional Engineer with 3 years of related experience

1.5.10.2 Associate Special Inspector

a. NICET Soils Technician Level I Certificate in Construction Material Testing with one year of related experience, or

b. Engineer-In-Training with one year of related experience

1.5.11 Deep Foundations

1.5.11.1 Special Inspector

a. NICET Soils Technician Level II Certificate in Construction Material Testing, or

b. Geologist-In-Training with 3 years of related experience, or

c. Registered Professional Engineer with 3 years of related experience

1.5.11.2 Associate Special Inspector

a. NICET Soils Technician Level I Certificate in Construction Material Testing with one year of related experience, or

b. NICET Geotechnical Engineering Technician Level I Construction or Generalist Certificate with one year of related experience, or

c. Engineer-In-Training with one year of related experience

1.5.12 Sprayed Fire-Resistive Material

1.5.12.1 Special Inspector

a. ICC Spray-applied Fireproofing Special Inspector Certificate, or

b. ICC Fire Inspector I Certificate with one year of related experience, or

c. Registered Professional Engineer or Architect with related experience

1.5.12.2 Associate Special Inspector

Engineer-In-Training with one year of related experience

1.5.13 Intumescent Fire-Resistive Coatings

1.5.13.1 Special Inspector

a. ICC Spray-applied Fireproofing Special Inspector Certificate, or

b. ICC Fire Inspector I Certificate with one year of related experience, or

c. Registered Professional Engineer or Architect with related experience

1.5.13.2 Associate Special Inspector

Engineer-In-Training with one year of related experience.

1.5.14 Exterior Insulation and Finish System (EIFS)

1.5.14.1 Special Inspector

a. Association of the Wall and Ceiling Industry (AWCI) EIFS Inspector Certificate, or

b. Exterior Design Institute Certificate, or

c. Registered Professional Engineer or Architect with related experience

1.5.14.2 Associate Special Inspector

Engineer-In-Training with one year of related experience.

1.5.15 Fire-Resistant Penetrations and Joints

1.5.15.1 Special Inspector

a. Passed the UL Firestop Exam with one year of related experience, or

b. Passed the FM Firestop Exam with one year of related experience, or

c. Passed the International Firestop Council Exam with one year of related experience, or

d. Registered Professional Engineer with related experience

1.5.15.2 Associate Special Inspector

Engineer-In-Training with one year of related experience.

1.5.16 Smoke Control

1.5.16.1 Special Inspector

a. Associated Air Balance Council (AABC) Technician Certification with one year of related experience, or

b. Registered Professional Engineer with related experience

1.5.16.2 Associate Special Inspector

Engineer-In-Training with one year of related experience.

PART 2 PRODUCTS

2.1 SPECIAL INSPECTION OF FABRICATED ITEMS

Special Inspection of fabricator's work performed in the fabricator's shop is required to be inspected in accordance with the Statement of Special Inspections and the Schedule of Special Inspections unless the fabricator is certified by the approved agency to perform such work without Special Inspections. Submit the following certifications to the Contracting Officer for information to allow work performed in the fabricator's shop to not be subjected to Special Inspections.

AISC Certified Steel Fabricator.

International Accreditation Service, AC472 Accreditation

At the completion of fabrication, submit a certificate of compliance, to be included with the comprehensive final report of Special Inspections, stating that the materials supplied and work performed by the fabricator are in accordance with the construction documents.

PART 3 EXECUTION

3.1 RESPONSIBILITIES

3.1.1 Quality Control Manager

a. Supervise all Special Inspectors required by the Contract Documents and the IBC.

b. Verify the qualifications of all the Special Inspectors.

c. Verify the qualifications of all fabricators.

d. Maintain a 3-ring binder for the Special Inspector's special inspection daily reports and special inspection biweekly reports. This binder must be located in a conspicuous place in the project trailer/office to allow review by the Contracting Officer and the SER.

e. Maintain a rework items list that includes discrepancies noted on the Special Inspector's daily report.

3.1.2 Special Inspectors

a. Inspect all elements of the project which the special inspector is qualified to inspect and which are identified in the Schedule of Special Inspections.

b. Attend preparatory phase meetings related to the Definable Feature of Work (DFOW) which the Special Inspector is qualified to inspect.

c. Submit Special Inspection agency's written NDT practices for the monitoring and control of the agency's operations, to include the following:

(1) The agency's procedures for the selection and administration of inspection personnel, describing the training, experience and examination requirements for qualification and certification of inspection personnel.

(2) The agency's inspection procedures, including general inspection, material controls, and visual welding inspection.

d. Submit Qualification Records for Nondestructive Testing Technicians for nondestructive testing (NDT) technicians designated for the project.

e. Submit NDT procedures and equipment calibration records for NDT to be performed and equipment to be used for the project.

f. Submit a copy of the special inspection daily reports to the QC Manager.

g. Report discrepancies that are observed during Special Inspections to the QC Manager for correction. If discrepancies are not corrected before the special inspector leaves the site the observed discrepancies must be documented in the daily report.

h. Submit a biweekly Special Inspection Report until all inspections are complete. A report is required for each biweekly period in which Special Inspections activity occurs, and must include the following:

(1) A brief summary of the work performed during the reporting time frame.

(2) Changes from and discrepancies with the drawings, specifications and mechanical or electrical component certification that were observed during the reporting period.

(3) Discrepancies which were resolved or corrected.

(4) A list of nonconforming items requiring resolution.

(5) All applicable test result, including nondestructive testing reports.

i. At the completion of each DFOW requiring Special Inspections, submit an interim report of Special Inspections that documents the Special Inspections completed for that DFOW. Identify the inspector responsible for each item inspected and corrections of all discrepancies noted in the daily reports. The interim report of Special Inspections must be signed and dated and it must indicate the certification of the Special Inspector qualifying them to conduct the inspection.

j. At the completion of the project, submit a comprehensive final report of Special Inspections that documents the Special Inspections completed for the project and corrections of all discrepancies noted in the daily reports. The comprehensive final report of Special Inspections must be signed and dated and it must indicate the certification of the Special Inspector qualifying them to conduct the inspection.

3.1.3 Structural Engineer of Record (SER)

a. Develop the Statement of Special Inspections and the Schedule of Special Inspections as defined in Chapter 17 of ICC IBC. Submit the

Statement of Special Inspections and the Schedule of Special Inspections for approval by the Contracting Officer.

The Statement of Special Inspections must include the following information:

(1) List of Architectural Components that are part of the Designated Seismic System.

(2) List of Mechanical Components that are part of the Designated Seismic System.

(3) List of the Electrical Components that are part of the Designated Seismic System.

(4) List of periodic walk-down inspections required by UFC 3-301-01.

(5) List of elements that are part of the progressive collapse resisting system.

Develop Schedule of Special Inspections using the template located on the Whole Building Design Guide website at: www.wbdg.org/dod/ufgs/ufgs-01-45-35

b. Prior to the start of structural observations submit a written statement identifying the frequency and extent of structural observations.

c. At the conclusion of the structural observations submit a final report of structural observations indicating that the structural observation site visits have been made and identify any reported deficiencies which, to the best of the structural observer's knowledge, have not been resolved.

d. Perform a final walk-down inspection of the mechanical and electrical components that are part of the designated seismic system with the Nonstructural Component Design Review Panel to ensure that the nonstructural components satisfy life safety mounting requirements as defined in the Statement of Special Inspections.

e. Submit a report of the final walk-down inspection that includes the following:

(1) Record of/observations from final site visit.

(2) Documentation that all required inspections were performed in accordance with the Statement of Special Inspections.

(3) Documentation that the Designated Seismic Systems were installed in accordance with the construction documents and the requirements of ICC IBC Chapter 17, as modified by UFC 3-301-01 or UFC 3-301-02.

3.2 DEFECTIVE WORK

Check work as it progresses, but failure to detect any defective work or materials must in no way prevent later rejection if defective work or materials are discovered, nor obligate the Contracting Officer to accept the defective work or materials.

-- End of Section --

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SECTION 01 50 00

TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS
11/20, CHG 3: 08/24

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C511	(2017; R 2021) Reduced-Pressure Principle Backflow Prevention Assembly

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2026; TIA 26-1; ERTA 26-1; TIA 26-2; TIA 26-3; TIA 26-4; TIA 26-5; TIA 26-6; TIA 26-7; ERTA 26-2; ERTA 26-3) National Electrical Code
NFPA 241	(2022; ERTA 22-1) Standard for Safeguarding Construction, Alteration, and Demolition Operations

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2024) Safety -- Safety and Occupational Health (SOH) Requirements

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)

MUTCD	(2023) Manual on Uniform Traffic Control Devices

1.2 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Construction Site Plan; G

Traffic Control Plan; G

Haul Road Plan; G

Contractor Computer Cybersecurity Compliance Statements

Contractor Temporary Network Cybersecurity Compliance Statements

SD-06 Test Reports

Backflow Preventer Tests

SD-07 Certificates

Backflow Tester Certification; G

Backflow Preventers Certificate of Full Approval

1.3 CONSTRUCTION SITE PLAN

Prior to the start of work, submit for Government approval a site plan showing the locations and dimensions of temporary facilities (including layouts and details, equipment and material storage area (onsite and offsite), and access and haul routes, avenues of ingress/egress to the fenced area and details of the fence installation. Identify any areas which may have to be graveled to prevent the tracking of mud. Indicate if the use of a supplemental or other staging area is desired. Show locations of safety and construction fences, site trailers, construction entrances, trash dumpsters, temporary sanitary facilities, and worker parking areas.

1.4 BACKFLOW PREVENTERS CERTIFICATE

1.4.1 Backflow Tester Certificate

Prior to testing, submit to the Contracting Officer certification issued by the State or local regulatory agency attesting that the backflow tester has successfully completed a certification course sponsored by the regulatory agency. Tester must not be affiliated with a company participating in other phases of this Contract.

1.4.2 Backflow Prevention Training Certificate

Submit a certificate recognized by the State or local authority that states the Contractor has completed at least 10 hours of training in backflow preventer installations. The certificate must be current.

1.5 CONDITION OF READINESS (COR) LEVELS FOR WEATHER

The Condition of Readiness (COR) is based on the weather forecast and the potential for sustained winds 50 knots (58 mph) or greater. Contact the Contracting Officer for the current COR.

Monitor weather conditions a minimum of twice a day and take appropriate actions according to the approved Emergency Plan in the accepted Accident Prevention Plan, EM 385-1-1 Emergency Plan requirements and the instructions below.

Unless otherwise directed by the Contracting Officer, comply with:

a. Condition FOUR (Sustained winds of 58 mph or greater expected within 72 hours): Normal daily jobsite cleanup and good housekeeping practices. Collect and store in piles or containers scrap lumber, waste material,

and rubbish for removal and disposal at the close of each work day. Maintain the construction site including storage areas, free of accumulation of debris. Stack form lumber in neat piles less than 3.3 feet high. Remove all debris, trash, or objects that could become missile hazards. Review requirements pertaining to ''Condition THREE" and continue action as necessary to attain "Condition FOUR" readiness. Contact Contracting Officer for weather and COR updates and completion of required actions.

b. Condition THREE (Sustained winds of 58 mph or greater expected within 48 hours): Maintain "Condition FOUR" requirements and commence securing operations necessary for "Condition ONE" which cannot be completed within 18 hours. Cease all routine activities which might interfere with securing operations. Commence securing and stow all gear and portable equipment. Make preparations for securing buildings. Reinforce or remove formwork and scaffolding. Secure machinery, tools, equipment, materials, or remove from the jobsite. Expend every effort to clear all missile hazards and loose equipment from general base areas. Contact Contracting Officer for weather and COR updates and completion of required actions. Review requirements pertaining to "Condition TWO" and continue action as necessary to attain "Condition THREE" readiness.

c. Condition TWO (Sustained winds of 58 mph or greater expected within 24 hours): Secure the jobsite, and leave Government premises.

d. Condition ONE. (Sustained winds of 58 mph or greater expected within 12 hours): Contractor access to the jobsite and Government premises is prohibited.

1.6 CYBERSECURITY DURING CONSTRUCTION

{For Reference Only: This subpart (and its subparts) relates to AC-18, SA-3, CCI-00258.} Meet the following requirements throughout the construction process.

1.6.1 Contractor Computer Equipment

Contractor owned computers may be used for construction. When used, contractor computers must meet the following requirements:

1.6.1.1 Operating System

The operating system must be an operating system currently supported by the manufacturer of the operating system. The operating system must be current on security patches and operating system manufacturer required updates.

1.6.1.2 Anti-Malware Software

The computer must run anti-malware software from a reputable software manufacturer. Anti-malware software must be a version currently supported by the software manufacturer, must be current on all patches and updates, and must use the latest definitions file. All computers used on this project must be scanned using the installed software at least once per day.

1.6.1.3 Passwords and Passphrases

The passwords and passphrases for all computers must be changed from their default values. Passwords must be a minimum of eight characters with a

minimum of one uppercase letter, one lowercase letter, one number and one special character.

1.6.1.4 Contractor Computer Cybersecurity Compliance Statements

Provide a single submittal containing completed Contractor Computer Cybersecurity Compliance Statements for each company using contractor owned computers. Contractor Computer Cybersecurity Compliance Statements must use the template published at https://www.wbdg.org/dod/ufgs/ufgs-01-50-00. Each Statement must be signed by a cybersecurity representative for the relevant company.

1.6.2 Temporary IP Networks

Temporary Contractor-installed IP networks may be used during construction. When used, temporary contractor-installed IP networks must meet the following requirements:

1.6.2.1 Network Boundaries and Connections

The network must not extend outside the project site and must not connect to any IP network other than IP networks provided under this project or Government furnished IP networks provided for this purpose. Any and all network access from outside the project site is prohibited.

1.6.3 Government Access to Network

Government personnel, as defined, prescribed, and identified by the Contracting Officer, must be allowed to have complete and immediate access to the network at any time in order to verify compliance with this specification. If there is a Government agency responsible for network access, identify that agency.

1.6.4 Temporary Wireless IP Networks

1.6.4.1 Contractor Provided Wi-Fi Network

Provide standalone Wi-Fi network for authorized Government personnel. Network access must be available throughout the jobsite and for the entire Contract period. The Government will use the Wi-Fi service for coordination in the field and related activities. Do not attach or connect the temporary Wi-Fi network to Government networks or systems unrelated to construction activities.

Password information must adhere to requirements outlined in Paragraph PASSWORDS AND PASSPHRASES. Provide password and Wi-Fi network name (SSID) to the Contracting Officer for Government personnel access. Wi-Fi performance must be capable of handling bandwidth to support Government and Contractor activities, including drawing and model access onsite. Provide a point of contact for reporting Wi-Fi outages.

1.6.4.2 Temporary Wireless IP Networks Security

In addition to the other requirements on temporary IP networks, temporary wireless IP (WiFi) networks must not interfere with existing wireless network and must use WPA2 security. Network names (SSID) for wireless networks must be changed from their default values.

1.6.5 Passwords and Passphrases

The passwords and passphrases for all network devices and network access must be changed from their default values. Passwords must be a minimum 8 characters with a minimum of one uppercase letter, one lowercase letter, one number and one special character.

1.6.6 Contractor Temporary Network Cybersecurity Compliance Statements

Provide a single submittal containing completed Contractor Temporary Network Cybersecurity Compliance Statements for each company implementing a temporary IP network. Contractor Temporary Network Cybersecurity Compliance Statements must use the template published at https://www.wbdg.org/dod/ufgs/ufgs-01-50-00. Each Statement must be signed by a cybersecurity representative for the relevant company. If no temporary IP networks will be used, provide a single copy of the Statement indicating this.

PART 2 PRODUCTS

2.1 TEMPORARY SIGNAGE

2.1.1 Bulletin Board

Prior to the commencement of work activities, provide a clear weatherproof covered bulletin board not less than 36 by 48 inches in size for displaying a copy of the wage decision contained in the Contract, Wage Rate Information poster, Safety and Health Information as required by EM 385-1-1 and other information approved by the Contracting Officer. Coordinate requirements herein with 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS. Locate the bulletin board at the project site in a conspicuous place easily accessible to all employees, and in location as approved by the Contracting Officer.

2.1.2 Project Identification Signs

The requirements for the signs, their content, and location are as specified in Section 01 58 00 PROJECT IDENTIFICATION. Erect signs within 15 days after receipt of the notice to proceed. Correct the data required by the safety sign daily, with light colored metallic or non-metallic numerals.

2.1.3 Warning Signs

Post temporary signs, tags, and labels to give workers and the public adequate warning and caution of construction hazards according to the EM 385-1-1. Attach signs to the perimeter fencing every 150 feet warning the public of the presence of construction hazards. Signs must require unauthorized persons to keep out of the construction site. Correct the data required by safety signs daily. Post signs at all points of entry designating the construction site as a hard hat area.

2.2 TEMPORARY TRAFFIC CONTROL

2.2.1 Haul Roads

Construct access and haul roads necessary for proper prosecution of the work under this Contract in accordance with EM 385-1-1. Construct with suitable grades and widths. Avoid sharp curves, blind corners, and dangerous cross traffic. Submit haul road plan for approval. Provide

necessary lighting, signs, barricades, and distinctive markings for the safe movement of traffic. The method of dust control, although optional, must be adequate to ensure safe operation at all times. Location, grade, width, and alignment of construction and haul roads are subject to approval by the Contracting Officer. Lighting must be adequate to assure full and clear visibility for full width of haul road and work areas during any night work operations.

2.2.2 Barricades

Erect and maintain temporary barricades to limit public access to hazardous areas. Barricades are required whenever safe public access to paved areas such as roads, parking areas or sidewalks is prevented by construction activities or as otherwise necessary to ensure the safety of both pedestrian and vehicular traffic. Securely place barricades clearly visible with adequate illumination to provide sufficient visual warning of the hazard during both day and night.

2.3 FENCING

Provide fencing along the construction site and at all open excavations and tunnels to control access by unauthorized personnel. Safety fencing must be highly visible to be seen by pedestrians and vehicular traffic. All fencing must meet the requirements of EM 385-1-1. Remove the fence upon completion and acceptance of the work.

2.3.1 Polyethylene Mesh Safety Fencing

Temporary safety fencing must be a high visibility orange colored, high density polyethylene grid, a minimum of 48 inches high and maximum mesh size of 2 inches. Fencing must extend from the grade to a minimum of 48 inches above the grade and be tightly secured to T-posts spaced as necessary to maintain a rigid and taut fence. Fencing must remain rigid and taut with a minimum of 200 pounds of force exerted on it from any direction with less than 4 inches of deflection.

2.3.2 Chain Link Panel Fencing

Temporary panel fencing must be galvanized steel chain link panels 8 feet high. Multiple fencing panels may be linked together at the bases to form long spans as needed. Each panel base must be weighted down using sand bags or other suitable materials in order for the fencing to withstand anticipated winds while remaining upright. Fencing must remain rigid and taut with a minimum of 200 pounds of force exerted on it from any direction with less than 4 inches of deflection.

2.3.3 Post-Driven Chain Link Fencing

Temporary post-driven fencing must be galvanized chain link fencing 8 feet high supported by an tightly secured to galvanized steel posts driven below grade. Fence posts must be located on minimum 10 foot centers. Posts may be set in various surfaces such as sand, soil, asphalt or concrete as necessary. Chain link fencing must remain rigid and taut with a minimum of 200 pounds of force exerted on it from any direction with less than 4 inches of deflection. Completely remove fencing and posts at the completion of construction and restore surfaces disturbed or damaged to its original condition. Locate and identify underground utilities prior to setting

fence posts. Equip fence with a lockable gate. Gate must remain locked when construction personnel are not present.

2.4 TEMPORARY WIRING

Provide temporary wiring in accordance with EM 385-1-1, NFPA 241 and NFPA 70. Include monthly inspection and testing of all equipment and apparatus.

2.5 BACKFLOW PREVENTERS

Certificate of Full Approval from FCCCHR List, University of Southern California, attesting that the design, size and make of each backflow preventer has satisfactorily passed the complete sequence of performance testing and evaluation for the respective level of approval. Certificate of Provisional Approval is not acceptable.

Reduced pressure principle type conforming to the applicable requirements AWWA C511. Provide backflow preventers complete with 150 pound flanged cast iron, ductile iron, bronze, brass mounted gate valve and strainer, stainless steel or bronze, internal parts.

PART 3 EXECUTION

3.1 EMPLOYEE PARKING

Construction Contract employees must park privately owned vehicles in an area designated by the Contracting Officer. Employee parking must not interfere with existing and established parking requirements of the Government installation.

3.2 AVAILABILITY AND USE OF UTILITY SERVICES

3.2.1 Temporary Utilities

Provide temporary utilities required for construction. Materials may be new or used, must be adequate for the required usage, not create unsafe conditions, and not violate applicable codes and standards.

3.2.2 Payment for Utility Services

The Contractor is responsible for the coordination, connection, and payment for all required utilities necessary for the project.

3.2.3 Meters and Temporary Connections

Provide and maintain necessary temporary connections, distribution lines, and meter bases (Government will provide meters) required to measure the amount of each utility used for the purpose of determining charges. Notify the Contracting Officer, in writing, 5 working days before final electrical connection is desired so that the utilities contract can be established. The Government will provide a meter and make the final hot connection after inspection and approval of the Contractor's temporary wiring installation. Do not make the final electrical connection.

3.2.4 Advance Deposit

An advance deposit for utilities consisting of an estimated month's usage or a minimum of $50.00 will be required. The last monthly bills for the fiscal year will normally be offset by the deposit and adjustments will be billed or returned as appropriate. Services to be rendered for the next fiscal year, beginning 1 October, will require a new deposit. Notification

of the due date for this deposit will be mailed prior to the end of the current fiscal year.

3.2.5 Final Meter Reading

Before completion of the work and final acceptance of the work by the Government, notify the Contracting Officer, in writing, 5 working days before termination is desired. The Government will take a final meter reading, disconnect service, and remove the meters. Then remove all the temporary distribution lines, meter bases, and associated appurtenances. Pay all outstanding utility bills before final acceptance of the work by the Government.

3.2.6 Sanitation

Provide and maintain within the construction area minimum field-type sanitary facilities in accordance with EM 385-1-1. Locate the facilities behind the construction fence or out of the public view. Clean units and empty wastes at least once a week or more frequently into a municipal, district, or station sanitary sewage system, or remove waste to a commercial facility. Obtain approval from the system owner prior to discharge into a municipal, district, or commercial sanitary sewer system. Penalties or fines associated with improper discharge will be the responsibility of the Contractor. Coordinate with the Contracting Officer and follow station regulations and procedures when discharging into the station sanitary sewer system. Maintain these conveniences at all times. Include provisions for pest control and elimination of odors. Government toilet facilities will not be available to Contractor's personnel.

3.2.7 Telephone

The Contractor shall make arrangements and pay all costs for telephone facilities desired.

3.2.8 Fire Protection

Provide temporary fire protection equipment for the protection of personnel and property during construction. Remove debris and flammable materials weekly to minimize potential hazards.

3.3 TRAFFIC PROVISIONS

3.3.1 Maintenance of Traffic

a. Conduct operations in a manner that will not close a thoroughfare or interfere with traffic on railways or highways except with written permission of the Contracting Officer at least 15 calendar days prior to the proposed modification date, and provide a Traffic Control Plan for Government approval detailing the proposed controls to traffic movement for approval. The plan must be in accordance with State and local regulations and the MUTCD, Part VI. Make all notifications and obtain all permits required for modification to traffic movements outside Station's jurisdiction.. Contractor may move oversized and slow-moving vehicles to the worksite provided requirements of the highway authority have been met.

b. Conduct work so as to minimize obstruction of traffic, and maintain traffic on at least half of the roadway width at all times. Obtain approval from the Contracting Officer prior to starting any activity that will obstruct traffic.

c. Provide, erect, and maintain, at Contractor's expense, lights, barriers, signals, passageways, detours, Life Safety Signage, overhead protection, and other items that may be required by the authority having jurisdiction.

d. Provide cones, signs, barricades, lights, or other traffic control devices and personnel required to control traffic. Do not use foil-backed material for temporary pavement marking because of its potential to conduct electricity during accidents involving downed power lines.

3.3.2 Protection of Traffic

Maintain and protect traffic on all affected roads during the construction period except as otherwise specifically directed by the Contracting Officer. Measures for the protection and diversion of traffic, including the provision of watchmen and flagmen, erection of barricades, placing oflights around and in front of equipment the work, and the erection and maintenance of adequate warning, danger, and direction signs, will be as required by the State and local authorities having jurisdiction. Provide self-illuminated (lighted) barricades during hours of darkness. All personnel working in roadways will wear brightly-colored vests or other high visibility apparel in accordance with EM 385-1-1. Protect the traveling public from damage to person and property. Minimize the interference with public traffic on roads selected for hauling material to and from the site. Investigate the adequacy of existing roads and their allowable load limit. Contractor is responsible for the repair of damage to roads caused by construction operations.

3.3.3 Rush Hour Restrictions

Do not interfere with the peak traffic flows preceding and during normal operations for the duration of the contract without notification to and approval by the Contracting Officer.

3.3.4 Dust Control

Dust control methods and procedures must be approved by the Contracting Officer. Coordinate dust control methods with 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS.

3.4 REDUCED PRESSURE BACKFLOW PREVENTERS

Provide an approved reduced pressure backflow prevention assembly at each location where the Contractor taps into the Government potable water supply.

Perform backflow preventer tests using test equipment, procedures, and certification forms conforming to those outlined in the latest edition of the Manual of Cross-Connection Control published by the FCCCHR Manual. Test and tag each reduced pressure backflow preventer upon initial installation (prior to continued water use) and as required by Pine Bluff Arsenal and utility provider. Tag must contain the following information: make, model, serial number, dates of tests, results, maintenance performed, and signature of tester. Record test results on certification forms conforming to requirements cited earlier in this paragraph.

3.5 CONTRACTOR'S TEMPORARY FACILITIES

Contractor is responsible for security of their property. Provide adequate

outside security lighting at the temporary facilities. Trailers must be anchored to resist high winds and meet applicable state or local standards for anchoring mobile trailers. Coordinate anchoring with EM 385-1-1. The Contract Clause entitled "RFO 52.236-10, Operations and Storage Areas" and the following apply:

3.5.1 Administrative Field Offices

Provide and maintain administrative field office facilities within the construction area at the designated site. Government office and warehouse facilities will not be available to the Contractor's personnel.

In the event a new building is constructed for the temporary project field office, it must be a minimum 12 feet in width, 16 feet in length and have a minimum of 7 feet headroom. Equip the building with approved electrical wiring, at least one double convenience outlet and the required switches and fuses to provide 110-120 volt power. Provide a work table with stool, desk with chair, two additional chairs, and one legal size file cabinet that can be locked. The building must be waterproof, supplied with a heater, have a minimum of two doors, electric lights, a telephone, a battery-operated smoke detector alarm, a sufficient number of adjustable windows for adequate light and ventilation, and a supply of approved drinking water. Provide approved sanitary facilities. Screen the windows and doors and provide the doors with deadbolt type locking devices or a padlock and heavy-duty hasp bolted to the door. Door hinge pins must be non-removable. Arrange the windows to open and to be securely fastened from the inside. Protect glass panels in windows by bars or heavy mesh screens to prevent easy access. In warm weather, provide air conditioning capable of maintaining the office at 50 percent relative humidity and a room temperature 20 degrees F below the outside temperature when the outside temperature is 95 degrees F. Unless otherwise directed by the Contracting Officer, remove the building from the site upon completion and acceptance of the work.

3.5.2 Quality Control Manager Records and Field Office

Provide on the jobsite an office with approximately 200 square feet of useful floor area for the exclusive use of the QC Manager. Provide a weathertight structure with adequate heating and cooling, toilet facilities, lighting, ventilation, a 4 by 8 foot plan table, a standard size office desk and chair, computer station, and working communications facilities. Provide either a 1,500 watt radiant heater and a window-mounted air conditioner rated at 9,000 Btus minimum or a window-mounted heat pump of the same minimum heating and cooling ratings. Provide a door with a cylinder lock and windows with locking hardware. Make utility connections. Locate as directed. File quality control records in the office and make available at all times to the Government. After completion of the work, remove the entire structure from the site.

3.5.3 Storage Area

Construct a temporary 8 foot high chain link fence around trailers and materials. Include plastic strip inserts, colored brown, so that visibility through the fence is obstructed. Fence posts may be driven, in lieu of concrete bases, where soil conditions permit. Do not place or store trailers, materials, or equipment outside the fenced area unless such trailers, materials, or equipment are assigned a separate and distinct storage area by the Contracting Officer away from the vicinity of the construction site but within the installation boundaries. Trailers, equipment, or materials must not be open to public view with the exception of those items which are in support of ongoing work on the current day. Do

not stockpile materials outside the fence in preparation for the next day's work. Park mobile equipment, such as tractors, wheeled lifting equipment, cranes, trucks, and like equipment within the fenced area at the end of each work day.

Keep fencing in a state of good repair and proper alignment. If the Contractor elects to traverse grassed or unpaved areas which are not established roadways with construction equipment or other vehicles, cover the grassed or unpaved areas with a layer of gravel as necessary to prevent rutting and the tracking of mud onto paved or established roadways; gravel gradation must be at the Contractor's discretion. Mow and maintain grass located within the boundaries of the construction site for the duration of the project. trailers, and neatly. Grass and vegetation along fences, structures, under in areas not accessible to mowers must be edged or trimmed

3.5.4 Supplemental Storage Area

Upon request, and pending availability, the Contracting Officer will designate another or supplemental area for the use and storage of trailers, equipment, and materials. This area may not be in close proximity of the construction site but will be within the installation boundaries. Maintain the area in a clean and orderly fashion and secured if needed to protect supplies and equipment. Utilities will not be provided to this area by the Government.

3.5.5 Appearance of Trailers

a. Trailers must be roadworthy and comply with all appropriate state and local vehicle requirements. Trailers which are rusted, have peeling paint or are otherwise in need of repair will not be allowed on Installation property. Trailers must present a clean and neat exterior appearance and be in a state of good repair.

b. Maintain the temporary facilities. Failure to do so will be sufficient reason to require their removal at the Contractor's expense.

3.5.6 Safety Systems

Protect the integrity of all installed safety systems or personnel safety devices. Obtain prior approval from the Contracting Officer if entrance into systems serving safety devices is required. If it is temporarily necessary to remove or disable personnel safety devices in order to accomplish Contract requirements, provide alternative means of protection prior to removing or disabling any permanently installed safety devices or equipment and obtain approval from the Contracting Officer.

3.5.7 Weather Protection of Temporary Facilities and Stored Materials

Take necessary precautions to ensure that roof openings and other critical openings in the building are monitored carefully. Take immediate actions required to seal off such openings when rain or other detrimental weather is imminent, and at the end of each workday. Ensure that the openings are completely sealed off to protect materials and equipment in the building from damage.

3.5.7.1 Building and Site Storm Protection

When a warning of gale force winds is issued, take precautions to minimize danger to persons, and protect the work and nearby Government property. Precautions must include, but are not limited to, closing openings;

removing loose materials, tools and equipment from exposed locations; and removing or securing scaffolding and other temporary work. Close openings in the work when storms of lesser intensity pose a threat to the work or any nearby Government property.

3.6 GOVERNMENT FIELD OFFICE

3.6.1 Resident Engineer's Office

Trailer to be a minimum of 400 sf containing 1-private office, 2-workstations or semi private offices, conference area that can accommodate 10 persons, and a unisex restroom. Trailer shall meet ADA and ABA requirements for entry and restroom.

At completion of the project, the office will remain the property of the Contractor and be removed from the site. Connections, disconnections, and payment for utilities consumed is the responsibility of the Contractor. Maintenance and weekly cleaning is also the responsibility of the Contractor. Utilities must be connected and disconnected in accordance with local codes and to the satisfaction of the Contracting Officer. Compliance with safety and appearance requirements for temporary facilities stated in previous paragraphs is required.

3.6.2 Trailer-Type Mobile Office

The option is available to furnish and maintain a trailer-type mobile office acceptable to the Contracting Officer to meet the requirements of the minimum facilities specified above. Securely anchor the trailer to the ground at all four corners to guard against movement during high winds. Coordinate requirements for proper anchoring with EM 385-1-1.

3.7 PLANT COMMUNICATIONS

Whenever the individual elements of the plant are located so that operation by normal voice between these elements is not satisfactory, install a satisfactory means of communication, such as telephone or other suitable devices and make available for use by Government personnel.

3.8 TEMPORARY PROJECT SAFETY FENCING

As soon as practicable, but not later than 15 days after the date established for commencement of work, furnish and erect temporary project safety fencing at the work site. Maintain the safety fencing during the life of the Contract and, upon completion and acceptance of the work, remove from the work site.

3.9 CLEANUP

Remove construction debris, waste materials, packaging material and the like from the work site daily. Any dirt or mud which is tracked onto paved or surfaced roadways must be cleaned away. Store all salvageable materials resulting from demolition activities within the fenced area described above or at the supplemental storage area. Neatly stack stored materials not in trailers, whether new or salvaged.

3.10 RESTORATION OF STORAGE AREA

Upon completion of the project remove the bulletin board, signs, barricades, haul roads, and all other temporary products from the site. After removal of trailers, materials, and equipment from within the fenced area, remove the fence. Restore areas used during the performance of the Contract to the original or better condition. Remove gravel used to

traverse grassed areas and restore the area to its original condition, including top soil and seeding as necessary.

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SECTION 01 57 19

TEMPORARY ENVIRONMENTAL CONTROLS
08/22, CHG 2: 08/25

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.1053	Respirable Crystalline Silica
29 CFR 1910.1200	Hazard Communication
29 CFR 1926.1153	Respirable Crystalline Silica
40 CFR 50	National Primary and Secondary Ambient Air Quality Standards
40 CFR 60	Standards of Performance for New Stationary Sources
40 CFR 63	National Emission Standards for Hazardous Air Pollutants for Source Categories
40 CFR 64	Compliance Assurance Monitoring
40 CFR 82	Protection of Stratospheric Ozone
40 CFR 112	Oil Pollution Prevention
40 CFR 122.26	Storm Water Discharges (Applicable to State NPDES Programs, see section 123.25)
40 CFR 152	Pesticide Registration and Classification Procedures
40 CFR 152 - 186	Pesticide Programs
40 CFR 241	Guidelines for Disposal of Solid Waste
40 CFR 243	Guidelines for the Storage and Collection of Residential, Commercial, and Institutional Solid Waste
40 CFR 258	Subtitle D Landfill Requirements
40 CFR 260	Hazardous Waste Management System: General
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 261.7	Residues of Hazardous Waste in Empty

	Containers
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 262.11	Hazardous Waste Determination and Recordkeeping
40 CFR 263	Standards Applicable to Transporters of Hazardous Waste
40 CFR 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 265	Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 266	Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities
40 CFR 268	Land Disposal Restrictions
40 CFR 273	Standards for Universal Waste Management
40 CFR 273.2	Standards for Universal Waste Management - Batteries
40 CFR 273.3	Standards for Universal Waste Management - Pesticides
40 CFR 273.4	Standards for Universal Waste Management - Mercury Containing Equipment
40 CFR 273.5	Standards for Universal Waste Management - Lamps
40 CFR 273.6	Applicability - Aerosol Cans
40 CFR 279	Standards for the Management of Used Oil
40 CFR 300	National Oil and Hazardous Substances Pollution Contingency Plan
40 CFR 300.125	National Oil and Hazardous Substances Pollution Contingency Plan - Notification and Communications
40 CFR 355	Emergency Planning and Notification
40 CFR 372	Toxic Chemical Release Reporting
40 CFR 403	General Pretreatment Regulations for Existing and New Sources of Pollution
40 CFR 745	Lead-Based Paint Poisoning Prevention in Certain Residential Structures

40 CFR 761	Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions
49 CFR 171	General Information, Regulations, and Definitions
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
49 CFR 172.101	Hazardous Material Regulation-Purpose and Use of Hazardous Material Table
49 CFR 173	Shippers - General Requirements for Shipments and Packagings
49 CFR 178	Specifications for Packagings

1.2 DEFINITIONS

1.2.1 Class I and II Ozone Depleting Substance (ODS)

Class I ODS is defined in Section 602(a) of The Clean Air Act. A list of Class I ODS can be found on the EPA website at the following weblink. https://www.epa.gov/ozone-layer-protection/ozone-depleting-substances.

Class II ODS is defined in Section 602(s) of The Clean Air Act. A list of Class II ODS can be found on the EPA website at the following weblink. https://www.epa.gov/ozone-layer-protection/ozone-depleting-substances.

1.2.2 Contractor Generated Hazardous Waste

Contractor generated hazardous waste is materials that, if abandoned or disposed of, may meet the definition of a hazardous waste. These waste streams would typically consist of material brought on site by the Contractor to execute work, but are not fully consumed during the course of construction. Examples include, but are not limited to, excess paint thinners (i.e., methyl ethyl ketone, toluene), waste thinners, excess paints, excess solvents, waste solvents, excess pesticides, and contaminated pesticide equipment rinse water.

1.2.3 Electronics Waste

Electronics waste is discarded electronic devices intended for salvage, recycling, or disposal.

1.2.4 Environmental Pollution and Damage

Environmental pollution and damage is the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade the environment aesthetically, culturally or historically.

1.2.5 Environmental Protection

Environmental protection is the prevention/control of pollution and habitat disruption that may occur to the environment during construction. The control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.2.6 Hazardous Debris

As defined in paragraph SOLID WASTE, debris that contains listed hazardous waste (either on the debris surface, or in its interstices, such as pore structure) in accordance with 40 CFR 261. Hazardous debris also includes debris that exhibits a characteristic of hazardous waste in accordance with 40 CFR 261.

1.2.7 Hazardous Materials

Hazardous material is any material that: Is defined in 49 CFR 171, listed in 49 CFR 172, regulated as a hazardous material in accordance with 49 CFR 173; or requires a Safety Data Sheet (SDS) in accordance with 29 CFR 1910.1200; or during end use, treatment, handling, packaging, storage, transportation, or disposal meets or has components that meet or have potential to meet the definition of a hazardous waste as defined by 40 CFR 261 Subparts A, B, C, or D. Designation of a material by this definition, when separately regulated or controlled by other sections or directives, does not eliminate the need for adherence to that hazard-specific guidance which takes precedence over this section for "control" purposes. Such material includes ammunition, weapons, explosive actuated devices, propellants, pyrotechnics, chemical and biological warfare materials, medical and pharmaceutical supplies, medical waste and infectious materials, bulk fuels, radioactive materials, and other materials such as asbestos, mercury, and polychlorinated biphenyls (PCBs).

1.2.8 Hazardous Waste

Hazardous Waste is any material that meets the definition of a solid waste and exhibits a hazardous characteristic (ignitability, corrosivity, reactivity, or toxicity) as specified in 40 CFR 261, Subpart C, or contains a listed hazardous waste as identified in 40 CFR 261, Subpart D, or meets a state, local, or host nation definition of a hazardous waste.

1.2.9 Installation Pest Management Coordinator

Installation Pest Management Coordinator (IPMC) is the individual officially designated by the Installation Commander to oversee the Installation Pest Management Program and the Installation Pest Management Plan.

1.2.10 Land Application

Land Application means spreading or spraying discharge water at a rate that allows the water to percolate into the soil. No sheeting action, soil erosion, discharge into storm sewers, discharge into defined drainage areas, or discharge into the "waters of the United States" must occur. Comply with federal, state, and local laws and regulations.

1.2.11 Municipal Separate Storm Sewer System (MS4) Permit

MS4 permits are those held by municipalities or installations to obtain NPDES permit coverage for their stormwater discharges.

1.2.12 National Pollutant Discharge Elimination System (NPDES)

The NPDES permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States.

1.2.13 Oily Waste

Oily waste are those materials that are, or were, mixed with Petroleum, Oils, and Lubricants (POLs) and have become separated from that POLs. Oily wastes also means materials, including wastewaters, centrifuge solids, filter residues or sludges, bottom sediments, tank bottoms, and sorbents which have come into contact with and have been contaminated by, POLs and may be appropriately tested and discarded in a manner which is in compliance with other state and local requirements.

This definition includes materials such as oily rags, "kitty litter" sorbent clay and organic sorbent material. These materials may be land filled provided that: It is not prohibited in other state regulations or local ordinances; the amount generated is "de minimus" (a small amount); it is the result of minor leaks or spills resulting from normal process operations; and free-flowing oil has been removed to the practicable extent possible. Large quantities of this material, generated as a result of a major spill or in lieu of proper maintenance of the processing equipment, are a solid waste. As a solid waste, perform a hazardous waste determination prior to disposal. As this can be an expensive process, it is recommended that this type of waste be minimized through good housekeeping practices and employee education.

1.2.14 Pesticide

Pesticide is any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest, or intended for use as a plant regulator, defoliant or desiccant.

1.2.15 Pesticide Treatment Plan

A plan for the prevention, monitoring, and control to eliminate pest infestation.

1.2.16 Pests

Pests are arthropods, birds, rodents, nematodes, fungi, bacteria, viruses, algae, snails, marine borers, snakes, weeds and other organisms (except for human or animal disease-causing organisms) that adversely affect readiness, military operations, or the well-being of personnel and animals; attack or damage real property, supplies, equipment, or vegetation; or are otherwise undesirable.

1.2.17 Project Pesticide Coordinator

The Project Pesticide Coordinator (PPC) is an individual who resides at a Civil Works Project office and who is responsible overseeing of pesticide application on project grounds.

1.2.18 Regulated Waste

Regulated waste are solid wastes that have specific additional federal, state, or local controls for handling, storage, or disposal.

1.2.19 Sediment

Sediment is soil and other debris that have eroded and have been transported by runoff water or wind.

1.2.20 Solid Waste

Solid waste is a solid, liquid, semi-solid or contained gaseous waste. A solid waste can be a hazardous waste, non-hazardous waste, or non-Resource Conservation and Recovery Act (RCRA) regulated waste. Types of solid waste typically generated at construction sites may include:

1.2.20.1 Debris

Debris is non-hazardous solid material generated during the construction, demolition, or renovation of a structure that exceeds 2.5-inch particle size that is: a manufactured object; plant or animal matter; or natural geologic material (for example, cobbles and boulders), broken or removed concrete, masonry, and rock asphalt paving; ceramics; roofing paper and shingles. Inert materials may be reinforced with or contain ferrous wire, rods, accessories and weldments. A mixture of debris and other material such as soil or sludge is also subject to regulation as debris if the mixture is comprised primarily of debris by volume, based on visual inspection.

1.2.20.2 Green Waste

Green waste is the vegetative matter from landscaping, land clearing and grubbing, including, but not limited to, grass, bushes, scrubs, small trees and saplings, tree stumps and plant roots. Marketable trees, grasses and plants that are indicated to remain, be re-located, or be re-used are not included.

1.2.20.3 Material Not Regulated As Solid Waste

Material not regulated as solid waste is nuclear source or byproduct materials regulated under the Federal Atomic Energy Act of 1954 as amended; suspended or dissolved materials in domestic sewage effluent or irrigation return flows, or other regulated point source discharges; regulated air emissions; and fluids or wastes associated with natural gas or crude oil exploration or production.

1.2.20.4 Non-Hazardous Waste

Non-hazardous waste is waste that is excluded from, or does not meet, hazardous waste criteria in accordance with 40 CFR 261.

1.2.20.5 Recyclables

Recyclables are materials, equipment and assemblies such as doors, windows, door and window frames, plumbing fixtures, glazing and mirrors that are recovered and sold as recyclable, and structural components. It also includes commercial-grade refrigeration equipment with Freon removed, household appliances where the basic material content is metal, clean

polyethylene terephthalate bottles, cooking oil, used fuel oil, textiles, high-grade paper products and corrugated cardboard, stackable pallets in good condition, clean crating material, and clean rubber/vehicle tires. Metal meeting the definition of "lead contaminated" or "lead based paint contaminated" may be included as recyclable only if the metal is handled and transported in accordance with regulations, and the facility receiving the material is permitted and authorized to accept and process lead contaminated materials. Paint cans that meet the definition of empty containers in accordance with 40 CFR 261.7 may be included as recyclable if sold to a scrap metal company.

1.2.20.6 Surplus Soil

Surplus soil is existing soil that is in excess of what is required for this work, including aggregates intended, but not used, for on-site mixing of concrete, mortars, and paving. Contaminated soil meeting the definition of hazardous material or hazardous waste is not included and must be managed in accordance with paragraph HAZARDOUS MATERIAL MANAGEMENT.All borrow or surplus or excavated soil originating from PBA property shall remain on site unless determined to be contaminated. Disposal locations of surplus soil shall be coordinated with the PBA Environmental Division.

1.2.20.7 Scrap Metal

This includes scrap and excess ferrous and non-ferrous metals such as reinforcing steel, structural shapes, pipe, and wire that are recovered or collected and disposed of as scrap. Scrap metal meeting the definition of hazardous material or hazardous waste is not included.

1.2.20.8 Wood

Wood is dimension and non-dimension lumber, plywood, chipboard, hardboard. Treated or painted wood that meets the definition of lead contaminated or lead based contaminated paint is not included. Treated wood includes, but is not limited to, lumber, utility poles, crossties, and other wood products with chemical treatment.

1.2.21 Surface Discharge

Surface discharge means discharge of water into drainage ditches, storm sewers, or creeks meeting the definition of "waters of the United States". Surface discharges from construction sites are discrete, identifiable sources and require a permit from the governing agency. Comply with federal, state, and local laws and regulations.

1.2.22 Wastewater

Wastewater is the aqueous liquid waste generated by a project, to include both domestic wastewater (sewage) and industrial wastewater.

1.2.22.1 Stormwater

Stormwater is any precipitation in an urban or suburban area that does not evaporate or soak into the ground, but instead collects and flows into storm drains, rivers, and streams.

1.2.23 Waters of the United States

Waters of the United States means Federally jurisdictional waters,

including wetlands, that are subject to regulation under Section 404 of the Clean Water Act or navigable waters, as defined under the Rivers and Harbors Act.

1.2.24 Wetlands

Wetlands are those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

1.2.25 Universal Waste

The universal waste regulations streamline collection requirements for certain hazardous wastes in the following categories: batteries, pesticides, mercury-containing equipment (for example, thermostats), and lamps (for example, fluorescent bulbs). The rule is designed to reduce hazardous waste in the municipal solid waste (MSW) stream by making it easier for universal waste handlers to collect these items and send them for recycling or proper disposal. These regulations can be found at 40 CFR 273.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Preconstruction Survey

Regulatory Notifications

Environmental Manager Qualifications

Employee Training Records

Environmental Protection Plan; G

Dirt and Dust Control Plan; G

Solid Waste Management Permit

Stormwater Pollution Prevention Plan (SWPPP); G

Stormwater Notice of Intent (for NPDES coverage under the general permit for construction activities)

Spill Prevention Control And Countermeasure (SPCC) Plan; G

SD-06 Test Reports

Monthly Solid Waste Disposal Report; G

Inspection Reports

SD-07 Certificates

Employee Training Records; G

Erosion and Sediment Control Inspector Qualifications

Certificate of Competency

SD-11 Closeout Submittals

Regulatory Notifications; G

Assembled Employee Training Records; G

Solid Waste Management Permit; G

Stormwater Pollution Prevention Plan Compliance Notebook; G,

Stormwater Notice of Termination (for NPDES coverage under the general permit for construction activities); G

As-Built Topographic Survey

Waste Determination Documentation; G

Project Solid Waste Disposal Documentation Report; G

Sales Documentation; G

Contractor Certification

Hazardous Waste/Debris Management; G

Disposal Documentation for Hazardous and Regulated Waste; G,

1.4 ENVIRONMENTAL PROTECTION REQUIREMENTS

Provide and maintain, during the life of the contract, environmental protection as defined. Plan for and provide environmental protective measures to control pollution that develops during construction practice. Plan for and provide environmental protective measures required to correct conditions that develop during the construction of permanent or temporary environmental features associated with the project. Protect the environmental resources within the project boundaries and those affected outside the limits of permanent work during the entire duration of this Contract. Comply with federal, state, and local regulations pertaining to the environment, including water, air, solid waste, hazardous waste and substances, oily substances, and noise pollution.

Tests and procedures assessing whether construction operations comply with Applicable Environmental Laws may be required. Analytical work must be performed by qualified laboratories; and where required by law, the laboratories must be certified.

1.4.1 Conformance with the Environmental Management System

Perform work under this contract consistent with the policy and objectives identified in the installation's Environmental Management System (EMS). Perform work in a manner that conforms to objectives and targets of the environmental programs and operational controls identified by the EMS. Support Government personnel when environmental compliance and EMS audits are conducted by escorting auditors at the Project site, answering questions, and providing proof of records being maintained. Provide monitoring and measurement information as necessary to address environmental performance relative to environmental, energy, and transportation management goals. In the event an EMS nonconformance or environmental noncompliance associated with the contracted services, tasks, or actions occurs, take corrective and preventative actions. In addition, employees must be aware of their roles and responsibilities under the installation EMS and of how these EMS roles and responsibilities affect work performed under the contract.

Coordinate with the installation's EMS coordinator to identify training needs associated with environmental aspects and the EMS, and arrange training or take other action to meet these needs. Provide training documentation to the Contracting Officer. The Installation Environmental Office will retain associated environmental compliance records. Make EMS Awareness training completion certificates available to Government auditors during EMS audits and include the certificates in the Employee Training Records. See paragraph EMPLOYEE TRAINING RECORDS.

1.5 SPECIAL ENVIRONMENTAL REQUIREMENTS

Comply with the special environmental requirements listed here: Pine Bluff Arsenal Master Plan EA .

1.6 QUALITY ASSURANCE

1.6.1 Preconstruction Survey and Protection of Features

This paragraph supplements the Contract Clause PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS. Prior to start of any onsite construction activities, perform a Preconstruction Survey of the project site with the Contracting Officer, and take photographs showing existing environmental conditions in and adjacent to the site. Submit a report for the record. Include in the report a plan describing the features requiring protection under the provisions of the Contract Clauses, which are not specifically identified on the drawings as environmental features requiring protection along with the condition of trees, shrubs and grassed areas immediately adjacent to the site of work and adjacent to the Contractor's assigned storage area and access route(s), as applicable. The Contractor and the Contracting Officer will sign this survey report upon mutual agreement regarding its accuracy and completeness. Protect those environmental features included in the survey report and any indicated on the drawings, regardless of interference that their preservation may cause to the work under the Contract.

1.6.2 Regulatory Notifications

Provide regulatory notification requirements in accordance with federal, state and local regulations. In cases where the Government will also provide public notification (such as stormwater permitting), coordinate with the Contracting Officer. Submit copies of regulatory notifications to

the Contracting Officer at least 30 days prior to commencement of work activities. Typically, regulatory notifications must be provided for the following (this listing is not all-inclusive): demolition, renovation, NPDES defined site work, construction, removal or use of a permitted air emissions source, and remediation of controlled substances (asbestos, hazardous waste, lead paint)

1.6.3 Environmental Brief

Attend an environmental brief to be included in the preconstruction meeting. Provide the following information: types, quantities, and use of hazardous materials that will be brought onto the installation; and types and quantities of wastes/wastewater that may be generated during the Contract. Discuss the results of the Preconstruction Survey at this time.

Prior to initiating any work on site, meet with the Contracting Officer and installation Environmental Office to discuss the proposed Environmental Protection Plan (EPP) or equipment local requirement. Develop a mutual understanding relative to the details of environmental protection, including measures for protecting natural and cultural resources, required reports, required permits, permit requirements (such as mitigation measures), and other measures to be taken.

1.6.4 Environmental Manager

Appoint in writing an Environmental Manager for the project site. The Environmental Manager is directly responsible for coordinating contractor compliance with federal, state, local, and installation requirements. The Environmental Manager must ensure compliance with Hazardous Waste Program requirements (including hazardous waste handling, storage, manifesting, and disposal); implement the EPP; ensure environmental permits are obtained, maintained, and closed out; ensure compliance with Stormwater Program requirements; ensure compliance with Hazardous Materials (storage, handling, and reporting) requirements; and coordinate any remediation of regulated substances (lead, asbestos, PCB transformers). This can be a collateral position; however, the person in this position must be trained to adequately accomplish the following duties: ensure waste segregation and storage compatibility requirements are met; inspect and manage Satellite Accumulation areas; ensure only authorized personnel add wastes to containers; ensure Contractor personnel are trained in 40 CFR requirements in accordance with their position requirements; coordinate removal of waste containers; and maintain the Environmental Records binder and required documentation, including environmental permits compliance and close-out. Submit Environmental Manager Qualifications to the Contracting Officer.

1.6.5 Employee Training Records

Prepare and maintain Employee Training Records throughout the term of the contract meeting applicable 40 CFR requirements. Provide Employee Training Records in the Environmental Records Binder. Submit these Assembled Employee Training Records to the Contracting Officer at the conclusion of the project, unless otherwise directed.

Train personnel to meet PBA and state requirements. Conduct environmental protection/pollution control meetings for personnel prior to commencing construction activities. Conduct additional meetings for new personnel and when site conditions change. Include in the training and meeting agenda: methods of detecting and avoiding pollution; familiarization with statutory and contractual pollution standards; installation and care of devices,

vegetative covers, and instruments required for monitoring purposes to ensure adequate and continuous environmental protection/pollution control; anticipated hazardous or toxic chemicals or wastes, and other regulated contaminants; recognition and protection of archaeological sites, artifacts, waters of the United States, and endangered species and their habitat that are known to be in the area. Provide copy of the Erosion and Sediment Control Inspector Certification as required by state.

1.6.5.1 Pest Control Training

Trained personnel in pest control. Conduct a pest control meeting for personnel prior to commencing construction activities. Conduct additional meetings for new personnel and when site conditions change. Include in the training and meeting agenda: methods of detecting and pest infestation; familiarization with statutory and contractual pest control standards; installation and care of devices, and instruments, if required, for monitoring purposes to ensure adequate and continuous pest control; anticipated hazardous or toxic chemicals or wastes, and other regulated contaminants; recognition and protection of waters of the United States, and endangered species and their habitat that are known to be in the area. Provide a Certificate of Competency for the personnel who will be conducting the pesticide application and management of pest control.

1.6.6 Non-Compliance Notifications

The Contracting Officer will notify the Contractor in writing of any observed noncompliance with federal, state or local environmental laws or regulations, permits, and other elements of the Contractor's EPP. After receipt of such notice, inform the Contracting Officer of the proposed corrective action and take such action when approved by the Contracting Officer. The Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. RFO 52.242-14 Suspension of Work provides that a suspension, delay, or interruption of work due to the fault or negligence of the Contractor allows for no adjustments to the contract for time extensions or equitable adjustments. In addition to a suspension of work, the Contracting Officer may use additional authorities under the contract or law.

1.7 ENVIRONMENTAL PROTECTION PLAN

The purpose of the EPP is to present an overview of known or potential environmental issues that must be considered and addressed during construction. Incorporate construction related objectives and targets from the installation's EMS into the EPP. Include in the EPP measures for protecting natural and cultural resources, required reports, and other measures to be taken. Meet with the Contracting Officer or Contracting Officer Representative to discuss the EPP and develop a mutual understanding relative to the details for environmental protection including measures for protecting natural resources, required reports, and other measures to be taken. Submit the EPP within 30 days after Contractor award and not less than 10 days before the preconstruction meeting. Revise the EPP throughout the project to include any reporting requirements, changes in site conditions, or contract modifications that change the project scope of work in a way that could have an environmental impact. No requirement in this section will relieve the Contractor of any applicable federal, state, and local environmental protection laws and regulations. During Construction, identify, implement, and submit for approval any additional requirements to be included in the EPP. Maintain the current version onsite.

The EPP includes, but is not limited to, the following elements:

1.7.1 General Overview and Purpose

1.7.1.1 Descriptions

A brief description of each specific plan required by environmental permit or elsewhere in this Contract such as stormwater pollution prevention plan, spill control plan, solid waste management plan, wastewater management plan, air pollution control plan, contaminant prevention plan, pesticide treatment plan, traffic control plan Hazardous, Toxic and Radioactive Waste (HTRW) Plan Non-Hazardous Solid Waste Disposal Plan borrowing material plan.

1.7.1.2 Duties

The duties and level of authority assigned to the person(s) on the job site who oversee environmental compliance, such as who is responsible for adherence to the EPP, who is responsible for spill cleanup and training personnel on spill response procedures, who is responsible for manifesting hazardous waste to be removed from the site (if applicable), and who is responsible for training the Contractor's environmental protection personnel.

1.7.1.3 Procedures

A copy of any standard or project-specific operating procedures that will be used to effectively manage and protect the environment on the project site.

1.7.1.4 Communications

Communication and training procedures that will be used to convey environmental management requirements to Contractor employees and subcontractors.

1.7.1.5 Contact Information

Emergency contact information contact information (office phone number, cell phone number, and e-mail address)

1.7.2 General Site Information

1.7.2.1 Drawings

Drawings showing locations of proposed temporary excavations or embankments for haul roads, stream crossings, jurisdictional wetlands, material storage areas, structures, sanitary facilities, storm drains and conveyances, and stockpiles of excess soil.

1.7.2.2 Work Area

Work area plan showing the proposed activity in each portion of the area and identify the areas of limited use or nonuse. Include measures for marking the limits of use areas, including methods for protection of features to be preserved within authorized work areas and methods to control runoff and to contain materials on site, and a traffic control plan.

Show where any fuels, hazardous substances, solvents, or lubricants will be

stored. Provide a spill plan to address any releases of those materials.

1.7.2.3 Documentation

A letter signed by an officer of the firm appointing the Environmental Manager and stating that person is responsible for managing and implementing the Environmental Program as described in this contract. Include in this letter the Environmental Manager's authority to direct the removal and replacement of non-conforming work.

1.7.3 Management of Natural Resources

a. Land resources

b. Tree protection

c. Replacement of damaged landscape features

d. Temporary construction

e. Stream crossings

f. Fish and wildlife resources

g. Wetland areas

1.7.4 Protection of Historical and Archaeological Resources

a. Objectives

b. Methods

1.7.5 Stormwater Management and Control

a. Ground cover

b. Erodible soils

c. Temporary measures

(1) Structural Practices

(2) Temporary and permanent stabilization

d. Effective selection, implementation and maintenance of Best Management Practices (BMPs).

e. Stormwater Pollution Prevention Plan (SWPPP).

1.7.6 Protection of the Environment from Waste Derived from Contractor Operations

This item consists of the management procedures for hazardous waste to be generated. The elements of those procedures will coincide with the Installation Hazardous Waste Management Plan when within an installation. The Contracting Officer will provide a copy of the Installation Hazardous Waste Management Plan as applicable.

As a minimum, include the following:

a. List of the types of hazardous wastes expected to be generated

b. Procedures to ensure a written waste determination is made for appropriate wastes that are to be generated

c. Sampling/analysis plan, including laboratory method(s) that will be used for waste determinations and copies of relevant laboratory certifications

d. Methods and proposed locations for hazardous waste accumulation/storage (that is, in tanks or containers)

e. Management procedures for storage, labeling, transportation, and disposal of waste (treatment of waste is not allowed unless specifically noted)

f. Management procedures and regulatory documentation ensuring disposal of hazardous waste complies with Land Disposal Restrictions (40 CFR 268)

g. Management procedures for recyclable hazardous materials such as lead-acid batteries, used oil, and similar

h. Used oil management procedures in accordance with 40 CFR 279; Hazardous waste minimization procedures

i. Plans for the disposal of hazardous waste by permitted facilities; and Procedures to be employed to ensure required employee training records are maintained.

1.7.7 Prevention of Releases to the Environment

Procedures to prevent releases to the environment

Notifications in the event of a release to the environment

1.7.8 Regulatory Notification and Permits

List what notifications and permit applications must be made. Some permits require up to 180 days to obtain. Demonstrate that those permits have been obtained or applied for by including copies of applicable environmental permits. The EPP will not be approved until the permits have been obtained.

1.7.9 Clean Air Act Compliance

1.7.9.1 Haul Route

Submit truck and material haul routes along with a Dirt and Dust Control Plan for controlling dirt, debris, and dust on Installation roadways. As a minimum, identify in the plan the subcontractor and equipment for cleaning along the haul route and measures to reduce dirt, dust, and debris from roadways.

1.7.9.2 Pollution Generating Equipment

Identify air pollution generating equipment or processes that may require federal, state, or local permits under the Clean Air Act. Determine requirements based on any current installation permits and the impacts of the project. Provide a list of all fixed or mobile equipment, machinery or

operations that could generate air emissions during the project to the Installation Environmental Office (Air Program Manager). Ensure required permits are obtained prior to installing and operating applicable equipment/processes.

1.7.9.3 Stationary Internal Combustion Engines

Identify portable and stationary internal combustion engines that will be supplied, used or serviced. Comply with 40 CFR 60 Subpart IIII, 40 CFR 60 Subpart JJJJ, 40 CFR 63 Subpart ZZZZ, and local regulations as applicable. At minimum, include the make, model, serial number, manufacture date, size (engine brake horsepower), and EPA emission certification status of each engine. Maintain applicable records and log hours of operation and fuel use. Logs must include reasons for operation and delineate between maintenance/testing, emergency, and non-emergency operation.

1.7.9.4 Refrigerants

Identify management practices to ensure that heating, ventilation, and air conditioning (HVAC) work involving refrigerants complies with 40 CFR 82 requirements. Technicians must be certified, maintain copies of certification on site, use certified equipment and log work that requires the addition or removal of refrigerant. Any refrigerant reclaimed is the property of the Government, coordinate with the Installation Environmental Office to determine the appropriate turn in location.

1.7.9.5 Air Pollution-engineering Processes

Identify planned air pollution-generating processes and management control measures (including, but not limited to, spray painting, abrasive blasting, demolition, material handling, fugitive dust, and fugitive emissions) Log hours of operations and track quantities of materials used.

1.7.9.6 Compliant Materials

Provide the Government a list of SDSs for all hazardous materials proposed for use on site. Materials must be compliant with all Clean Air Act regulations for emissions including solvent and volatile organic compound contents, and applicable National Emission Standards for Hazardous Air Pollutants requirements. The Government may alter or limit use of specific materials as needed to meet installation permit requirements for emissions.

1.8 LICENSES AND PERMITS

Obtain licenses and permits required for the construction of the project and in accordance with RFO 52.236-7 Permits and Responsibilities. Notify the Government of all equipment that may require permits or special approvals that the Contractor plans to use on site. This paragraph supplements the Contractor's responsibility under RFO 52.236-7 Permits and Responsibilities.

1.9 ENVIRONMENTAL RECORDS BINDER

Maintain on-site a separate three-ring Environmental Records Binder and submit at the completion of the project. Make separate parts within the binder that correspond to each submittal listed under paragraph CLOSEOUT SUBMITTALS in this section.

1.10 PESTICIDE DELIVERY, STORAGE, AND HANDLING

1.10.1 Delivery and Storage

Deliver pesticides to the site in the original, unopened containers bearing legible labels indicating the EPA registration number and the manufacturer's registered uses. Store pesticides according to manufacturer's instructions and under lock and key when unattended.

1.10.2 Handling Requirements

Formulate, treat with, and dispose of pesticides and associated containers in accordance with label directions and use the clothing and personal protective equipment specified on the labeling for use during each phases of the application. Furnish SDSs for pesticide products.

1.11 SOLID WASTE MANAGEMENT PERMIT

Provide the Contracting Officer with written notification of the quantity of anticipated solid waste or debris that is anticipated or estimated to be generated by construction. Include in the report the locations where various types of waste will be disposed or recycled. Include letters of acceptance from the receiving location or as applicable; submit one copy of the receiving location state and local Solid Waste Management Permit or license showing such agency's approval of the disposal plan before transporting wastes off Government property.

1.11.1 Monthly Solid Waste Disposal Report

Monthly, submit a solid waste disposal report to the Contracting Officer. For each waste, the report will state the classification (using the definitions provided in this section), amount, location, and name of the business receiving the solid waste.

1.12 FACILITY HAZARDOUS WASTE GENERATOR STATUS

Pine Bluff Arsenal is designated as a Small Quantity Generator. Meet the regulatory requirements of this generator designation for any work conducted within the boundaries of this Installation. Comply with provisions of federal, state, and local regulatory requirements applicable to this generator status regarding training and storage, handling, and disposal of construction derived wastes.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 PROTECTION OF NATURAL RESOURCES

Minimize interference with, disturbance to, and damage to fish, wildlife, and plants, including their habitats. Prior to the commencement of activities, consult with the Installation Environmental Office as applicable, regarding rare species or sensitive habitats that need to be protected. The protection of rare, threatened, and endangered animal and plant species identified, including their habitats, is the Contractor's responsibility.

Preserve the natural resources within the project boundaries and outside the limits of permanent work. Restore to an equivalent or improved condition upon completion of work that is consistent with the requirements of the Installation Environmental Office or as otherwise specified. Confine construction activities to within the limits of the work indicated or specified.

3.1.1 Flow Ways

Do not alter water flows or otherwise significantly disturb the native habitat adjacent to the project and critical to the survival of fish and wildlife, except as specified and permitted.

3.1.2 Vegetation

Except in areas to be cleared, do not remove, cut, deface, injure, or destroy trees or shrubs without the Contracting Officer's permission. Do not fasten or attach ropes, cables, or guys to existing nearby trees for anchorages unless authorized by the Contracting Officer. Where such use of attached ropes, cables, or guys is authorized, the Contractor is responsible for any resultant damage.

Protect existing trees and critical root zones (CRZ) that are to remain to ensure they are not injured, bruised, defaced, or otherwise damaged by construction operations. Remove displaced rocks from uncleared areas. Coordinate with the Contracting Officer and Installation Environmental Office to determine appropriate action for trees and other landscape features scarred or damaged by equipment operations.

3.1.3 Streams

Stream crossings must allow movement of materials or equipment without violating water pollution control standards of the federal, state, and local governments. Construction of stream crossing structures must be in compliance with all required permits including, but not limited to, Clean Water Act Section 404, and Section 401 Water Quality.

The Contracting Officer's approval and appropriate permits are required before any equipment will be permitted to ford live streams. In areas where frequent crossings are required, install temporary culverts or bridges. Obtain Contracting Officer's approval prior to installation. Remove temporary culverts or bridges upon completion of work, and repair the area to its original condition unless otherwise required by the Contracting Officer.

3.2 STORMWATER

Do not discharge stormwater from construction sites to the sanitary sewer. If the water is noted or suspected of being contaminated, it may only be released to the storm drain system if the discharge is specifically permitted. Obtain authorization in advance from the Installation Environmental Office for any release of contaminated water.

3.2.1 Construction General Permit

Provide a Construction General Permit as required by 40 CFR 122.26 and the State of Arkansas General Permit. Under the terms and conditions of the permit, install, inspect, maintain BMPs, prepare stormwater erosion and sediment control inspection reports, and submit SWPPP inspection reports.

Maintain construction operations and management in compliance with the terms and conditions of the general permit for stormwater discharges from construction activities.

3.2.1.1 Stormwater Pollution Prevention Plan

Submit a project-specific Stormwater Pollution Prevention Plan (SWPPP) to the Contracting Officer for approval, prior to the commencement of work. The SWPPP must meet the requirements of 40 CFR 122.26 and the Arkansas State General Permit for stormwater discharges from construction sites.

Include the following:

a. Comply with terms of the Arkansas state general permit for stormwater discharges from construction activities. Prepare SWPPP in accordance with Arkansas state requirements. Use Arkansasstate guide Developing your Stormwater Pollution Prevention Plan located at https://www.epa.gov/npdes/developing-stormwater-pollution-prevention-plan-swppp to prepare the SWPPP.

b. Select applicable BMPs from EPA Fact Sheets located at https://www.epa.gov/npdes/national-menu-best-management-practices-bmps-stormwater#constr or in accordance with applicable state or local requirements.

c. Include a completed copy of the Notice of Intent, BMP Inspection Report Template, and Stormwater Notice of Termination, except for the effective date.

3.2.1.2 Stormwater Notice of Intent for Construction Activities

Prepare and submit the Notice of Intent for NPDES coverage under the general permit for construction activities to the Contracting Officer for review.

Submit the approved NOI and appropriate permit fees onto the appropriate federal or state agency for approval. No land disturbing activities may commence without permit coverage. Maintain an approved copy of the SWPPP at the onsite construction office, and continually update as regulations require, reflecting current site conditions.

3.2.1.3 Inspection Reports

Submit "Inspection Reports" to the Contracting Officer in accordance with the State of Arkansas Construction General Permit.

3.2.1.4 Stormwater Pollution Prevention Plan Compliance Notebook

Create and maintain a three ring binder of documents that demonstrate compliance with the Construction General Permit. Include a copy of the permit Notice of Intent, proof of permit fee payment, SWPPP and SWPPP update amendments, inspection reports and related corrective action records, copies of correspondence with the Arkansas State Permitting Agency, and a copy of the permit Notice of Termination in the binder. At project completion, the notebook becomes property of the Government. Provide the compliance notebook to the Contracting Officer.

3.2.1.5 Stormwater Notice of Termination for Construction Activities

Submit a Notice of Termination to the Contracting Officer for approval once construction is complete and final stabilization has been achieved on all portions of the site for which the permittee is responsible. Once approved, submit the Notice of Termination to the appropriate state or federal agency. Prepare as-built topographic survey information required by the permitting agency for certification of the stormwater management system and provide to the Contracting Officer.

3.2.2 Erosion and Sediment Control Measures

Provide erosion and sediment control measures in accordance with state and local laws and regulations. Preserve vegetation to the maximum extent practicable.

Erosion control inspection reports may be compiled as part of a stormwater pollution prevention plan inspection reports.

3.2.2.1 Erosion Control

Prevent erosion by mulching, Compost Blankets, Geotextiles, temporary slope drains, or any combination as required. Stabilize slopes by chemical stabilization, sodding, seeding, or such combination of these methods necessary for effective erosion control. Use of hay bales is prohibited.

3.2.2.2 Sediment Control Practices

Implement sediment control practices to divert flows from exposed soils, temporarily store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Implement sediment control practices prior to soil disturbance and prior to creating areas with concentrated flow, during the construction process to minimize erosion and sediment laden runoff. Include the following devices: silt fence, temporary diversion dikes, storm drain inlet protection, or other acceptable measures.

3.2.3 Work Area Limits

Mark the areas that need not be disturbed under this Contract prior to commencing construction activities. Mark or fence isolated areas within the general work area that are not to be disturbed. Protect monuments and markers before construction operations commence. Where construction operations are to be conducted during darkness, all markers must be visible in the dark. Personnel must be knowledgeable of the purpose for marking and protecting particular objects.

3.2.4 Contractor Facilities and Work Areas

Place field offices, staging areas, stockpile storage, and temporary buildings in areas designated on the drawings or as directed by the Contracting Officer. Move or relocate the Contractor facilities only when approved by the Government. Provide erosion and sediment controls for onsite borrow and spoil areas to prevent sediment from entering nearby waters. Control temporary excavation and embankments for plant or work areas to protect adjacent areas.

3.2.5 Municipal Separate Storm Sewer System (MS4) Management

Comply with the Installation's MS4 permit requirements.

3.3 SURFACE AND GROUNDWATER

3.3.1 Waters of the United States

Do not enter, disturb, destroy, or allow discharge of contaminants into waters of the United States.

3.4 PROTECTION OF CULTURAL RESOURCES

3.4.1 Archaeological Resources

If, during excavation or other construction activities, any previously unidentified or unanticipated historical, archaeological, and cultural resources are discovered or found, activities that may damage or alter such resources will be suspended. Resources covered by this paragraph include, but are not limited to: any human skeletal remains or burials; artifacts; shell, midden, bone, charcoal, or other deposits; rock or coral alignments, pavings, wall, or other constructed features; and any indication of agricultural or other human activities. Upon such discovery or find, immediately notify the Contracting Officer so that the appropriate authorities may be notified and a determination made as to their significance and what, if any, special disposition of the finds should be made. Cease all activities that may result in impact to or the destruction of these resources. Secure the area and prevent employees or other persons from trespassing on, removing, or otherwise disturbing such resources. The Government retains ownership and control over archaeological resources.

3.4.2 Historical Resources

Existing historical resources within the work area are shown on the drawings. Protect these resources and be responsible for their preservation during the life of the Contract.

3.5 AIR RESOURCES

Equipment operation, activities, or processes will be in accordance with 40 CFR 64 and state air emission and performance laws and standards.

3.5.1 Preconstruction Air Permits

Notify the Air Program Manager, through the Contracting Officer, at least 6 months prior to bringing equipment, assembled or unassembled, onto the Installation, so that air permits can be secured. Necessary permitting time must be considered in regard to construction activities. Clean Air Act (CAA) permits must be obtained prior to bringing equipment, assembled or unassembled, onto the Installation.

Confirm that these permits have been obtained.

3.5.2 Oil or Dual-fuel Boilers and Furnaces

Provide product data and details for new, replacement, or relocated fuel fired boilers, heaters, or furnaces to the Installation Environmental Office (Air Program Manager) through the Contracting Officer. Data to be reported include: equipment purpose (water heater, building heat, process),

manufacturer, model number, serial number, fuel type (oil type, gas type) size (MMBTU heat input). Provide in accordance with paragraph PRECONSTRUCTION AIR PERMITS.

3.5.3 Burning

Burning is prohibited on the Government premises.

3.5.4 Class I and II ODS Prohibition

Class I and II ODS are Government property and must be returned to the Government for appropriate management. Coordinate with the Installation Environmental Office to determine the appropriate location for turn in of all reclaimed refrigerant.

3.5.5 Venting of Refrigerant

Accidental venting of a refrigerant is a release and must be reported immediately to the Contracting Officer. Intentional venting of refrigerants (including most Non-ODS substitute refrigerants) is prohibited per 40 CFR 82.

3.5.6 EPA Certification Requirements

Heating and air conditioning technicians must be certified through an EPA-approved program. Maintain copies of certifications at the employees' places of business; technicians must carry certification wallet cards, as provided by environmental law.

3.5.7 Dust Control

Keep dust down at all times, including during nonworking periods. Sprinkle or treat, with dust suppressants, the soil at the site, haul roads, and other areas disturbed by operations. Dry power brooming will not be permitted. Instead, use vacuuming, wet mopping, wet sweeping, or wet power brooming. Air blowing will be permitted only for cleaning nonparticulate debris such as steel reinforcing bars. Only wet cutting will be permitted for cutting concrete blocks, concrete, and bituminous concrete. Do not unnecessarily shake bags of cement, concrete mortar, or plaster. Since these products contain Crystalline Silica, comply with the applicable OSHA standard, 29 CFR 1910.1053 or 29 CFR 1926.1153 for controlling exposure to Crystalline Silica Dust.

3.5.7.1 Particulates

Dust particles, aerosols and gaseous by-products from construction activities, and processing and preparation of materials (such as from asphaltic batch plants) must be controlled at all times, including weekends, holidays, and hours when work is not in progress. Maintain excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and other work areas within or outside the project boundaries free from particulates that would exceed 40 CFR 50, state, and local air pollution standards or that would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, baghouse, scrubbers, electrostatic precipitators, or other methods will be permitted to control particulates in the work area. Sprinkling, to be efficient, must be repeated to keep the disturbed area damp. Provide sufficient, competent equipment available to accomplish these tasks. Perform particulate control as the work proceeds and whenever a particulate

nuisance or hazard occurs. Comply with state and local visibility regulations.

3.5.7.2 Abrasive Blasting

Blasting operations cannot be performed without prior approval of the Installation Air Program Manager. The use of silica sand is prohibited in sandblasting.

Provide tarpaulin drop cloths and windscreens to enclose abrasive blasting operations to confine and collect dust, abrasive agent, paint chips, and other debris.

3.5.8 Odors

Control odors from construction activities. The odors must be in compliance with state regulations and local ordinances and may not constitute a health hazard.

3.6 WASTE MINIMIZATION

Minimize the use of hazardous materials and the generation of waste. Include procedures for pollution prevention/ hazardous waste minimization in the Hazardous Waste Management Section of the EPP. Obtain a copy of the installation's Pollution Prevention/Hazardous Waste Minimization Plan for reference material when preparing this part of the EPP. If no written plan exists, obtain information by contacting the Contracting Officer. Describe the anticipated types of the hazardous materials to be used in the construction when requesting information.

3.6.1 Salvage, Reuse and Recycle

Identify anticipated materials and waste for salvage, reuse, and recycling. Describe actions to promote material reuse, resale or recycling. To the extent practicable, all scrap metal must be sent for reuse or recycling and will not be disposed of in a landfill.

Include the name, physical address, and telephone number of the hauler, if transported by a franchised solid waste hauler. Include the destination and, unless exempted, provide a copy of the state or local permit (cover) or license for recycling.

3.6.2 Nonhazardous Solid Waste Diversion Report

Maintain an inventory of nonhazardous solid waste diversion and disposal of construction and demolition debris. Submit a report to the Contracting Officer on the first working day after each fiscal year quarter, starting the first quarter that nonhazardous solid waste has been generated. Include the following in the report:

Construction and Demolition (C&D) Debris Disposed	cubic yards or tons, as appropriate
C&D Debris Recycled	cubic yards or tons, as appropriate

Construction and Demolition (C&D) Debris Disposed	cubic yards or tons, as appropriate
C&D Debris Composted	cubic yards or tons, as appropriate
Total C&D Debris Generated	cubic yards or tons, as appropriate
Waste Sent to Waste-To-Energy Incineration Plant (This amount should not be included in the recycled amount)	cubic yards or tons, as appropriate

3.7 WASTE MANAGEMENT AND DISPOSAL

3.7.1 Waste Determination Documentation

Complete a Waste Determination form (provided at the pre-construction conference) for Contractor-derived wastes to be generated. All potentially hazardous solid waste streams that are not subject to a specific exclusion or exemption from the hazardous waste regulations (e.g., scrap metal, domestic sewage) or subject to special rules, (lead-acid batteries and precious metals) must be characterized in accordance with the requirements of 40 CFR 262.11 or corresponding applicable state or local regulations. Base waste determination on user knowledge of the processes and materials used, and analytical data when necessary. Consult with the Installation environmental staff for guidance on specific requirements. Attach support documentation to the Waste Determination form. As a minimum, provide a Waste Determination form for the following waste (this listing is not exhaustive): oil- and latex -based painting and caulking products, solvents, adhesives, aerosols, petroleum products, and containers of the original materials.

3.7.2 Solid Waste Management

3.7.2.1 Project Solid Waste Disposal Documentation Report

Provide copies of the waste handling facilities' weight tickets, receipts, bills of sale, and other sales documentation. In lieu of sales documentation, a statement indicating the disposal location for the solid waste that is signed by an employee authorized to legally obligate or bind the firm may be submitted. The sales documentation Contractor certification must include the receiver's tax identification number and business, EPA or state registration number, along with the receiver's delivery and business addresses and telephone numbers. For each solid waste retained for the Contractor's own use, submit the information previously described in this paragraph on the solid waste disposal report. Prices paid or received do not have to be reported to the Contracting Officer unless required by other provisions or specifications of this Contract or public law.

3.7.2.2 Control and Management of Solid Wastes

Pick up solid wastes, and place in covered containers that are regularly emptied. Do not prepare or cook food on the project site. Prevent contamination of the site or other areas when handling and disposing of

wastes. At project completion, leave the areas clean. Employ segregation measures so that no hazardous or toxic waste will become co-mingled with non-hazardous solid waste. Transport solid waste off Government property and dispose of it in compliance with 40 CFR 260, state, and local requirements for solid waste disposal. A Subtitle D RCRA permitted landfill is the minimum acceptable offsite solid waste disposal option. Verify that the selected transporters and disposal facilities have the necessary permits and licenses to operate. Solid waste disposal offsite must comply with most stringent local, state, and federal requirements, including 40 CFR 241, 40 CFR 243, and 40 CFR 258.

Manage hazardous material used in construction, including but not limited to, aerosol cans, waste paint, cleaning solvents, contaminated brushes, and used rags, in accordance with 49 CFR 173.

3.7.3 Control and Management of Hazardous Waste

Do not dispose of hazardous waste on Government property. Do not discharge any waste to a sanitary sewer, storm drain, or to surface waters or conduct waste treatment or disposal on Government property without written approval of the Contracting Officer and Installation Hazardous Waste Manager.

3.7.3.1 Hazardous Waste/Debris Management

Identify construction activities that will generate hazardous waste or debris. Provide a documented waste determination for resultant waste streams. Identify, label, handle, store, and dispose of hazardous waste or debris in accordance with federal, state, and local regulations, including 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, 40 CFR 266, and 40 CFR 268.

Manage hazardous waste in accordance with the approved Hazardous Waste Management Section of the EPP. Store hazardous wastes in approved containers in accordance with 49 CFR 173 and 49 CFR 178. Hazardous waste generated within the confines of Government facilities is identified as being generated by the Government. Prior to removal of any hazardous waste from Government property, hazardous waste manifests must be signed by personnel from the Installation Environmental Office. Do not bring hazardous waste onto Government property. Provide the Contracting Officer with a copy of waste determination documentation for any solid waste streams that have any potential to be hazardous waste or contain any chemical constituents listed in 40 CFR 372-SUBPART D.

3.7.3.2 Waste Storage/Satellite Accumulation/90 Day Storage Areas

Accumulate hazardous waste at satellite accumulation points and in compliance with 40 CFR 262 and applicable state or local regulations. Individual waste streams will be limited to 55 gallons of accumulation (or one quart for acutely hazardous wastes). If the Contractor expects to generate hazardous waste at a rate and quantity that makes satellite accumulation impractical, the Contractor may request a temporary 90-day or 180-day, as appropriate, accumulation point be established. Submit a request in writing to the Contracting Officer and provide the following information (Attach Site Plan to the Request):

Contract Number	
Contractor	

Contract Number	
Haz/Waste or Regulated Waste POC	
Phone Number	
Type of Waste	
Source of Waste	
Emergency POC	
Phone Number	
Location of the Site	

Attach a Waste Determination form for the expected waste streams. Allow 10 working days for processing this request. Additional compliance requirements (e.g., training and contingency planning) that may be required are the responsibility of the Contractor. Barricade the designated area where waste is being stored and post a sign identifying as follows:

"DANGER - UNAUTHORIZED PERSONNEL KEEP OUT"

3.7.3.3 Hazardous Waste Disposal

3.7.3.3.1 Responsibilities for Contractor's Disposal

Provide hazardous waste manifest to the Installations Environmental Office for review, approval, and signature prior to shipping waste off Government property.

3.7.3.3.1.1 Services

Provide service necessary for the final treatment or disposal of the hazardous material or waste in accordance with 40 CFR 260 - 40 CFR 279, local, and state, laws and regulations, and the terms and conditions of the Contract within 60 days after the materials have been generated. These services include necessary personnel, labor, transportation, packaging, detailed analysis (if required for disposal or transportation, include manifesting or complete waste profile sheets, equipment, and compile documentation).

3.7.3.3.1.2 Samples

Obtain a representative sample of the material generated for each job done to provide waste stream determination.

3.7.3.3.1.3 Analysis

Analyze each sample taken and provide analytical results to the Contracting Officer. See paragraph WASTE DETERMINATION DOCUMENTATION.

3.7.3.3.1.4 Labeling

During waste accumulation label all containers in accordance with 40 CFR 262. Prior to offering a waste for off-site transport, determine the Department of Transportation's (DOT's) proper shipping names for waste in accordance with 49 CFR 172 (each container requiring disposal) and demonstrate to the Contracting Officer how this determination is developed and supported by

the sampling and analysis requirements contained herein. Label all containers of hazardous waste with the words "Hazardous Waste" or other words to describe the contents of the container in accordance with 40 CFR 262 and applicable state or local regulations.

3.7.3.3.2 Contractor Disposal Turn-In Requirements

Hazardous waste generated must be disposed of in accordance with the following conditions to meet installation requirements:

a. Drums must be compatible with waste contents and drums must meet DOT requirements for 49 CFR 173 for transportation of materials.

b. Band drums to wooden pallets.

c. No more than three 55 gallon drums or two 85 gallon over packs are to be banded to a pallet.

d. Band using 1-1/4 inch minimum band on upper third of drum.

e. Provide label in accordance with 49 CFR 172.101.

f. Leave 3 to 5 inches of empty space above volume of material.

3.7.3.4 Universal Waste Management

Manage the following categories of universal waste in accordance with federal, state, and local requirements and installation instructions:

a. Batteries as described in 40 CFR 273.2

b. Lamps as described in 40 CFR 273.5

c. Mercury-containing equipment as described in 40 CFR 273.4

d. Aerosol cans as described in 40 CFR 273.6

e. Pesticides as described in 40 CFR 273.3

Mercury is prohibited in the construction of this facility, unless specified otherwise, and with the exception of mercury vapor lamps and fluorescent lamps. Dumping of mercury-containing materials and devices such as mercury vapor lamps, fluorescent lamps, and mercury switches, in rubbish containers is prohibited. Remove without breaking, pack to prevent breakage, and transport out of the activity in an unbroken condition for disposal as directed.

3.7.3.5 Electronics End-of-Life Management

Recycle or dispose of electronics waste, including, but not limited to, used electronic devices such computers, monitors, hard-copy devices, televisions, mobile devices, in accordance with 40 CFR 260-262, state, and local requirements, and installation instructions.

3.7.3.6 Disposal Documentation for Hazardous and Regulated Waste

Contact the Contracting Officer for the facility RCRA identification number that is to be used on each manifest.

3.7.4 Releases/Spills of Oil and Hazardous Substances

3.7.4.1 Response and Notifications

Exercise due diligence to prevent, contain, and respond to spills of hazardous material, hazardous substances, hazardous waste, sewage, regulated gas, petroleum, lubrication oil, and other substances regulated in accordance with 40 CFR 300. Maintain spill cleanup equipment and materials at the work site. In the event of a spill, take prompt, effective action to stop, contain, curtail, or otherwise limit the amount, duration, and severity of the spill/release. In the event of any releases of oil and hazardous substances, chemicals, or gases; immediately (within 15 minutes) notify the Installation Fire Department, the Installation Command Duty Officer, the Installation Environmental Office, the Contracting Officer and the state or local authority.

Submit verbal and written notifications as required by the federal (40 CFR 300.125 and 40 CFR 355), state, local regulations and instructions. Provide copies of the written notification and documentation that a verbal notification was made within 20 days. Spill response must be in accordance with 40 CFR 300 and applicable state and local regulations. Contain and clean up these spills without cost to the Government.

3.7.4.2 Clean Up

Clean up hazardous and non-hazardous waste spills. Reimburse the Government for costs incurred including sample analysis materials, clothing, equipment, and labor if the Government will initiate its own spill cleanup procedures, for Contractor- responsible spills, when: Spill cleanup procedures have not begun within one hour of spill discovery/occurrence; or, in the Government's judgment, spill cleanup is inadequate and the spill remains a threat to human health or the environment.

3.7.5 Mercury Materials

Immediately report to the Environmental Office and the Contracting Officer instances of breakage or mercury spillage. Clean mercury spill area to the satisfaction of the Contracting Officer.

Do not recycle a mercury spill cleanup; manage it as a hazardous waste for disposal.

3.7.6 Wastewater

3.7.6.1 Disposal of Wastewater

Disposal of wastewater must be as specified below.

3.7.6.1.1 Treatment

Do not allow wastewater from construction activities, such as onsite material processing, concrete curing, foundation and concrete clean-up, water used in concrete trucks, and forms to enter water ways or to be discharged into the stormwater system or sanitary sewer system.. Dispose of the construction- related waste water off-Government property in accordance with 40 CFR 403, state, regional, and local laws and Prior to disposal, submit a WIS to the Installation Environmental Office and have the results reviewed and approved by the Contracting Officer prior to being

discharged or disposed of off- Government property.

3.7.6.1.2 Surface Discharge

Surface discharge in accordance with federal, state, and local laws and regulations.

3.7.6.1.3 Land Application

Water generated from the flushing of lines after disinfection or disinfection in conjunction with hydrostatic testing must be land- applied in accordance with federal, state, and local laws and regulations for land application.

3.8 HAZARDOUS MATERIAL MANAGEMENT

Include hazardous material control procedures in the Accident Prevention Plan (APP), in accordance with Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS. Address procedures and proper handling of hazardous materials, including the appropriate transportation requirements. Do not bring hazardous material onto Government property that does not directly relate to requirements for the performance of this contract. Submit an SDS and estimated quantities to be used for each hazardous material to the Contracting Officer prior to bringing the material on the installation. Typical materials requiring SDS and quantity reporting include, but are not limited to, oil and latex based painting and caulking products, solvents, adhesives, aerosol, and petroleum products. Use hazardous materials in a manner that minimizes the amount of hazardous waste generated. Containers of hazardous materials must have National Fire Protection Association labels or their equivalent. Certify that hazardous materials removed from the site are hazardous materials and do not meet the definition of hazardous waste, in accordance with 40 CFR 261 and state and Pine Bluff Arsenal requirements.

3.9 PREVIOUSLY USED EQUIPMENT

Clean previously used construction equipment prior to bringing it onto the project site. Equipment must be free from soil residuals, egg deposits from plant pests, noxious weeds, and plant seeds. Consult with the U.S. Department of Agriculture jurisdictional office for additional cleaning requirements.

3.10 CONTROL AND MANAGEMENT OF ASBESTOS-CONTAINING MATERIAL (ACM)

Manage and dispose of asbestos- containing waste in accordance with all applicable federal, state, and local (or Host Nation) requirements. Manifest asbestos-containing waste and provide the manifest to the Contracting Officer. Notifications to the regulatory authorities and Installation Air Program Manager are required before starting any asbestos work.

3.11 CONTROL AND MANAGEMENT OF LEAD-BASED PAINT (LBP)

Manage and dispose of lead-contaminated waste in accordance with 40 CFR 745 . Manifest any lead-contaminated waste and provide the manifest to the Contracting Officer.

3.12 CONTROL AND MANAGEMENT OF POLYCHLORINATED BIPHENYLS (PCBs)

Manage and dispose of PCB-contaminated waste in accordance with 40 CFR 761

3.13 CONTROL AND MANAGEMENT OF LIGHTING BALLAST AND LAMPS CONTAINING PCBs

Manage and dispose of contaminated waste in accordance with 40 CFR 761.

3.14 MILITARY MUNITIONS

In the event military munitions, as defined in 40 CFR 260, are discovered or uncovered, immediately stop work in that area and immediately inform the Contracting Officer.

3.15 PETROLEUM, OIL, LUBRICANT (POL) STORAGE AND FUELING

POL products include flammable or combustible liquids, such as gasoline, diesel, lubricating oil, used engine oil, hydraulic oil, mineral oil, and cooking oil. Store POL products and fuel equipment and motor vehicles in a manner that affords the maximum protection against spills into the environment. Manage and store POL products in accordance with EPA 40 CFR 112, and other federal, state, regional, and local laws and regulations. Use secondary containments, dikes, curbs, and other barriers, to prevent POL products from spilling and entering the ground, storm or sewer drains, stormwater ditches or canals, or navigable waters of the United States. Describe in the EPP (see paragraph ENVIRONMENTAL PROTECTION PLAN) how POL tanks and containers must be stored, managed, and inspected and what protections must be provided. Storage of fuel on the project site must be in accordance with EPA, state, and local laws and regulations and paragraph OIL STORAGE INCLUDING FUEL TANKS.

3.15.1 Used Oil Management

Manage used oil generated on site in accordance with 40 CFR 279. Determine if any used oil generated while onsite exhibits a characteristic of hazardous waste. Used oil containing 1,000 parts per million of solvents is considered a hazardous waste and disposed of at the Contractor's expense. Used oil mixed with a hazardous waste is also considered a hazardous waste. Dispose in accordance with paragraph HAZARDOUS WASTE DISPOSAL.

3.15.2 Oil Storage Including Fuel Tanks

Provide secondary containment and overfill protection for oil storage tanks. A berm used to provide secondary containment must be of sufficient size and strength to contain the contents of the tanks plus 5 inches freeboard for precipitation. Construct the berm to be impervious to oil for 72 hours that no discharge will permeate, drain, infiltrate, or otherwise escape before cleanup occurs. Use drip pans during oil transfer operations; adequate absorbent material must be onsite to clean up any spills and prevent releases to the environment. Cover tanks and drip pans during inclement weather. Provide procedures and equipment to prevent overfilling of tanks. If tanks and containers with an aggregate aboveground capacity greater than 1320 gallons will be used onsite (only containers with a capacity of 55 gallons or greater are counted), provide and implement a Spill Prevention Control and Countermeasure (SPCC) plan meeting the requirements of 40 CFR 112. Do not bring underground storage tanks to the installation for Contractor use during a project. Submit the SPCC plan to the Contracting Officer for approval.

Monitor and remove any rainwater that accumulates in open containment dikes or berms. Inspect the accumulated rainwater prior to draining from a containment dike to the environment, to determine there is no oil sheen present.

3.16 INADVERTENT DISCOVERY OF PETROLEUM-CONTAMINATED SOIL OR HAZARDOUS WASTES

If petroleum-contaminated soil, or suspected hazardous waste is found during construction that was not identified in the Contract documents, immediately notify the Contracting Officer. Do not disturb this material until authorized by the Contracting Officer.

3.17 PEST MANAGEMENT

In order to minimize impacts to existing fauna and flora, coordinate with the Installation Pest Management Coordinator (IPMC) or Project Pesticide Coordinator (PPC), through the Contracting Officer, at the earliest possible time prior to pesticide application. Discuss integrated pest management strategies including prevention of invasive species as applicable with the IPMC and receive concurrence from the IPMC through the Contracting Officer prior to the application of any pesticide associated with these specifications. Provide Installation Project Office Pest Management personnel the opportunity to be present at meetings concerning treatment measures for pest or disease control and during application of the pesticide. For termiticide requirements, seeother specification in the Contract. The use and management of pesticides are regulated under 40 CFR 152 - 186.

3.17.1 Application

Apply pesticides using a state-certified pesticide applicator in accordance with EPA label restrictions and recommendation. The certified applicator must wear clothing and personal protective equipment as specified on the pesticide label. The Contracting Officer **will** designate locations for water used in formulating. Do not allow the equipment to overflow. Inspect equipment for leaks, clogging, wear, or damage and repair prior to application of pesticide.

3.17.2 Pesticide Treatment Plan

Include and update a pesticide treatment plan, as information becomes available. Include in the plan the sequence of treatment, dates, times, locations, pesticide trade name, EPA registration numbers, authorized uses, chemical composition, formulation, original and applied concentration, application rates of active ingredient (that is, pounds of active ingredient applied), equipment used for application and calibration of equipment. Comply with 40 CFR 152-189, state, regional, and local pest management record-keeping and reporting requirements as well as any additional Installation Project Office specific requirements in conformance with DA AR 200-1 Chapter 5, Pest Management, Section 5-4 "Program requirements" for data required to be reported to the Installation.

3.18 CHLORDANE

Evaluate excess soils and concrete foundation debris generated during the demolition of housing units or other wooden structures for the presence of chlordane or other pesticides prior to reuse or final disposal.

3.19 SOUND INTRUSION

Make the maximum use of low-noise emission products, as certified by the EPA. Blasting or use of explosives are not permitted without written permission from the Contracting Officer, and then only during the designated times. Confine pile-driving operations to the period between 8 a.m. and 4 p.m., Monday through Friday, exclusive of holidays, unless otherwise specified.

Keep construction activities under surveillance and control to minimize environment damage by noise. Comply with the provisions of the State of Arkansas rules.

3.20 POST CONSTRUCTION CLEANUP

Clean up areas used for construction in accordance with Contract Clause: "Cleaning Up". Unless otherwise instructed in writing by the Contracting Officer, remove traces of temporary construction facilities such as haul roads, work area, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other vestiges of construction prior to final acceptance of the work. Grade parking area and similar temporarily used areas to conform with surrounding contours.

-- End of Section --

SECTION 01 58 00

PROJECT IDENTIFICATION
08/19, CHG 5: 08/22

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. ARMY CORPS OF ENGINEERS (USACE)

EP 310-1-6a	(2006; 2019 Change 2) Project Operation -- Sign Standards Manual, VOL 1
EP 310-1-6b	(2006) Sign Standards Manual, VOL 2, Appendices

1.2 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Sign Legend Orders; G, AO

1.3 PROJECT IDENTIFICATION SIGN

1.3.1 Construction Project Signs

Furnish the construction project sign package, maintain the signs during construction, and remove the signs from the job site upon completion of the project. The construction project sign package consists of two signs: one for project identification and the other to show the on-the-job safety performance of the contractor. Ensure that the package conforms to the requirements of EP 310-1-6a and EP 310-1-6b, specifically Section 16. Submit the sign legend orders as described in Section 16 of EP 310-1-6a before erecting the signs.

Utilize the Example Graphic of Signage with Dimensions for MILCON Project and follow USACE policy provided in Engineering Pamphlet (EP) 310-1-6a, Sign Standards Manual, VOL 1 for guidelines on fabricating, locating, and mounting construction project signs (https://www.publications.usace.army.mil/Portals/76/Users/182/86/2486/EP 310-1-6a%20change%202.pdf).

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 74 19

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL
02/19, CHG 3: 11/21

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 273	Standards for Universal Waste Management
49 CFR 173	Shippers - General Requirements for Shipments and Packagings
49 CFR 178	Specifications for Packagings

1.2 DEFINITIONS

1.2.1 Co-mingle

The practice of placing unrelated materials together in a single container, usually for benefits of convenience and speed.

1.2.2 Construction Waste

Waste generated by construction activities, such as scrap materials, damaged or spoiled materials, temporary and expendable construction materials, and other waste generated by the workforce during construction activities.

1.2.3 Demolition Debris/Waste

Waste generated from demolition activities, including minor incidental demolition waste materials generated as a result of Intentional dismantling of all or portions of a building, to include clearing of building contents that have been destroyed or damaged.

1.2.4 Disposal

Depositing waste in a solid waste disposal facility, usually a managed landfill or incinerator, regulated in the US under the Resource Conservation and Recovery Act (RCRA).

1.2.5 Diversion

The practice of diverting waste from disposal in a landfill or incinerator, by means of eliminating or minimizing waste, or reuse of materials.

1.2.6 Final Construction Waste Diversion Report

A written assertion by a material recovery facility operator identifying constituent materials diverted from disposal, usually including summary

tabulations of materials, weight in short-ton.

1.2.7 Recycling

The series of activities, including collection, separation, and processing, by which products or other materials are diverted from the solid waste stream for use in the form of raw materials in the manufacture of new products sold or distributed in commerce, or the reuse of such materials as substitutes for goods made of virgin materials, other than fuel.

1.2.8 Reuse

The use of a product or materials again for the same purpose, in its original form or with little enhancement or change.

1.2.9 Salvage

Usable, salable items derived from buildings undergoing demolition or deconstruction, parts from vehicles, machinery, other equipment, or other components.

1.2.10 Source Separation

The practice of administering and implementing a management strategy to identify and segregate unrelated waste at the first opportunity.

1.3 CONSTRUCTION WASTE (INCLUDES DEMOLITION DEBRIS/WASTE)

Divert a minimum of 60 percent by weight of the project construction waste and demolition debris/waste from the landfill or incinerator. Follow applicable industry standards in the management of waste. Apply sound environmental principles in the management of waste. (1) Practice efficient waste management when sizing, cutting, and installing products and materials and (2) use all reasonable means to divert construction waste and demolition debris/waste from landfills and incinerators and to facilitate the recycling or reuse of excess construction materials.

1.4 CONSTRUCTION WASTE MANAGEMENT

Implement a Construction Waste Management Program for the project. Take a pro-active, responsible role in the management of construction waste, recycling process, disposal of demolition debris/waste, and require all subcontractors, vendors, and suppliers to participate in the Construction Waste Management Program. Establish a process for clear tracking, and documentation of construction waste and demolition debris/waste.

1.4.1 Implementation of Construction Waste Management Program

Develop and document how the Construction Waste Management Program will be implemented in a Construction Waste Management Plan. Submit a Construction Waste Management Plan to the Contracting Officer for approval. Construction waste and demolition debris/waste materials include un-used construction materials not incorporated in the final work, as well as demolition debris/waste materials from demolition activities or deconstruction activities. In the management of waste, consider the availability of viable markets, the condition of materials, the ability to provide material in suitable condition and in a quantity acceptable to available markets, and time constraints imposed by internal project completion mandates.

1.4.2 Oversight

The Quality Control Manager, as specified in Section 01 45 00 QUALITY CONTROL, is responsible for overseeing and documenting results from executing the Construction Waste Management Plan for the project.

1.4.3 Special Programs

Implement special programs involving rebates or similar incentives related to recycling of construction waste and demolition debris/waste materials. Retain revenue or savings from salvaged or recycling, unless otherwise directed. Ensure firms and facilities used for recycling, reuse, and disposal are permitted for the intended use to the extent required by federal, state, and local regulations.

1.4.4 Special Instructions

Provide on-site instruction of appropriate separation, handling, recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the projects. Designation of single source separating or commingling will be clearly marked on the containers.

1.4.5 Waste Streams

Delineate waste streams and characterization, including estimated material types and quantities of waste, in the Construction Waste Management Plan. Manage all waste streams associated with the project. Typical waste streams are listed below. Include additional waste steams not listed:

a. Land Clearing Debris

b. Asphalt

c. Masonry and CMU

d. Concrete

e. Metals (Includes, but is not limited to, banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized, stainless steel, aluminum, copper, zinc, bronze.)

f. Wood (nails and staples allowed)

g. Glass

h. Paper

i. Plastics (PET, HDPE,PVC,LDPE,PP,PS, Other)

j. Gypsum

k. Non-hazardous paint and paint cans

l. Carpet

m. Ceiling Tiles

n. Insulation

o. Beverage Containers

1.5 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Construction Waste Management Plan; G

SD-06 Test Reports

Quarterly Reports

Annual Report

SD-11 Closeout Submittals

Final Construction Waste Diversion Report; S

1.6 MEETINGS

Conduct Construction Waste Management meetings. After award of the Contract and prior to commencement of work, schedule and conduct a meeting with the Contracting Officer to discuss the proposed Construction Waste Management Plan and to develop a mutual understanding relative to the management of the Construction Waste Management Program and how waste diversion requirements will be met.

The requirements of this meeting may be fulfilled during the coordination and mutual Understanding meeting outlined in Section 01 45 00 QUALITY CONTROL. At a minimum, discuss and document waste management goals at following meetings:

a. Preconstruction meeting.

b. Regular site meetings.

c. Work safety meeting (if applicable).

1.7 CONSTRUCTION WASTE MANAGEMENT PLAN

Submit Construction Waste Management Plan within 15 days after contract award. Revise and resubmit Construction Waste Management Plan as necessary, in order for construction to begin. Execute demolition or deconstruction activities in accordance with the approved construction waste management plan.

An approved Construction Waste Management Plan will not relieve the Contractor of responsibility for compliance with applicable environmental regulations or meeting project cumulative waste diversion requirement. Ensure all subcontractors receive a copy of the approved Construction Waste Management Plan. The plan demonstrates how to meet the project waste diversion requirement. Also, include the following in the plan:

a. Identify the names of individuals responsible for waste management and waste management tracking, along with roles and responsibilities on the project.

b. Actions that will be taken to reduce solid waste generation, including coordination with subcontractors to ensure awareness and participation.

c. Description of the regular meetings to be held to address waste management.

d. Description of the specific approaches to be used in recycling/reuse of the various materials generated, including the areas on site and equipment to be used for processing, sorting, and temporary storage of materials.

e. Name of landfill and incinerator to be used.

f. Identification of local and regional re-use programs, including non-profit organizations such as schools, local housing agencies, and organization that accept used materials such as material exchange networks and resale stores. Include the name, location, phone number for each re-use facility identified, and provide a copy of the permit or license for each facility.

g. List of specific materials, by type and quantity, that will be salvaged for resale, salvaged and reused on the current project, salvaged and stored for reuse on a future project, or recycled. Identify the recycling facilities by name, address, and phone number.

h. Identification of materials that cannot be recycled or reused with an explanation or justification, to be approved by the Contracting Officer.

i. Description of the means by which materials identified in item (g) above will be protected from contamination.

j. Description of the means of transportation of the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site).

k. Copy of training plan for subcontractors and other services to prevent contamination by co-mingling materials identified for diversion and waste materials.

l. Identification of at least 5 construction or demolition material streams for diversion.

m. Detailed plan and distribution of waste diversion between buildings, when project is a part of a campus.

n. Facilities or subcontractors offering construction waste transport on-site or off-site must ensure that proper shipping orders, bill of lading, manifests, or other shipping documents containing waste diversion information meet requirements of 40 CFR 273 Universal Waste Management, 49 CFR 173 Shippers - General Requirements for Shipments and Packagings, and 49 CFR 178 Specifications for Packaging. Individuals signing manifests or other shipping documents should meet the minimum training requirements.

o. List each supplier who deliver construction materials, in bulk, or package products in returnable containers or returnable packaging, or have take-back programs. List each program and the applicable material to actively monitor and track to assist in meeting waste diversion requirements on the project.

p. Identify local jurisdiction requirements for waste management. Include local requirements and points of contact.

Distribute copies of the waste management plan to each subcontractor, Quality Control Manager , and the Contracting Officer.

1.8 RECORDS (DOCUMENTATION)

1.8.1 General

Maintain records to document the types and quantities of waste generated and diverted though re-use, recycling and sale to third parties; through disposal to a landfill or incinerator facility. Provide explanations for materials not recycled, reused or sold. Collect and retain manifests, weight tickets, sales receipts, and invoices specifically identifying diverted project waste materials or disposed materials.

1.8.2 Accumulated

Maintain a running record of materials generated and diverted from landfill disposal, including accumulated diversion rates for the project. Make records available to the Contracting Officer during construction or incidental demolition activities. Provide a copy of the diversion records to the Contracting Officer upon completion of the construction, incidental demolitions or minor deconstruction activities.

1.9 REPORTS

1.9.1 General

Maintain current construction waste diversion information on site for periodic inspection by the Contracting Officer. Include in the quarterly reports, annual reports and final reports: the project name, contract information, information for waste generated, diverted and disposed of for the current reporting period and show cumulative totals for the project. Reports must identify quantifies of waste by type and disposal method. Also include in each report, supporting documentation to include manifests, weigh tickets, receipts, and invoices specifically identifying the project and waste material type and weighted sum.

1.9.2 Quarterly Reporting

Provide cumulative reports at the end of each quarter (December, March, June, and September, corresponding with the federal fiscal year for reporting purposes). Submit quarterly reports not later than 15 calendar days after the preceding quarter has ended. Submit Quarterly Reports to the appropriate office or identified point of contact.

1.9.3 Annual Reporting

Provide a cumulative construction waste diversion report annually. Submit annual report not later than 30 calendar days after the preceding fourth

quarter has ended. Provide copy of annual construction waste diversion report to the installation POC.

1.10 FINAL CONSTRUCTION WASTE DIVERSION REPORT

A Final Construction Waste Diversion Report is required at the end of the project. Provide Final Construction Waste Diversion Report 60 days prior to the Beneficial Occupancy Date (BOD). The final Construction Waste Diversion Report must be included in the Sustainability eNotebook in accordance with Section 01 33 29 SUSTAINABILITY REQUIREMENTS AND REPORTING.

1.11 COLLECTION

Collect, store, protect, and handle reusable and recyclable materials at the site in a manner which prevents contamination, and provides protection from the elements to preserve their usefulness and monetary value. Provide receptacles and storage areas designated specifically for recyclable and reusable materials and label them clearly and appropriately to prevent contamination from other waste materials. Keep receptacles or storage areas neat and clean.

Train subcontractors and other service providers to either separate waste streams or use the co-mingling method as described in the Construction Waste Management Plan. Handle hazardous waste and hazardous materials in accordance with applicable regulations and coordinate with Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS. Separate materials by one of the following methods:

1.11.1 Source Separation Method

Separate waste products and materials that are recyclable from trash and sort as described below into appropriately marked separate containers and then transport to the respective recycling facility for further processing. Deliver materials in accordance with recycling or reuse facility requirements (e.g., free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process). Separate materials into the category types as defined in the Construction Waste Management Plan.

1.11.2 Co-Mingled Method

Place waste products and recyclable materials into a single container and then transport to an authorized recycling facility, which meets all applicable requirements to accept and dispose of recyclable materials in accordance with all applicable local, state and federal regulations. The Co-mingled materials must be sorted and processed in accordance with the approved Construction Waste Management Plan.

1.11.3 Other Methods

Other methods proposed by the Contractor may be used when approved by the Contracting Officer.

1.12 DISPOSAL

Control accumulation of waste materials and trash. Recycle or dispose of collected materials off-site at intervals approved by the Contracting Officer and in compliance with waste management procedures as described in

the waste management plan. Except as otherwise specified in other sections of the specifications, dispose of in accordance with the following:

1.12.1 Reuse

Give first consideration to reusing construction and demolition materials as a disposition strategy. Recover for reuse materials, products, and components as described in the approved Construction Waste Management Plan. Coordinate with the Contracting Officer to identify onsite reuse opportunities or material sales or donation available through Government resale or donation programs. Sale of recovered materials is not allowed on the Installation. Consider the use of surplus industrial supply broker services, who match entities with reusable or repurpose industrial materials with entities with need of such materials.

1.12.2 Recycle

Recycle non-hazardous construction and demolition/debris materials that are not suitable for reuse. Track rejection of contaminated recyclable materials by the recycling facility. Rejected recyclables materials will not be counted as a percentage of diversion calculation. Recycle all fluorescent lamps, HID lamps, mercury (Hg) -containing thermostats and ampoules, and PCBs-containing ballasts and electrical components as directed by the Contracting Officer. Do not crush lamps on site as this creates a hazardous waste stream with additional handling requirements.

1.12.3 Waste

Dispose by landfill or incineration only those waste materials with no practical use, economic benefit, or recycling opportunity.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used. -- End of Section --

SECTION 01 78 00

CLOSEOUT SUBMITTALS
05/19, CHG 1: 08/21

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. ARMY CORPS OF ENGINEERS (USACE)

ERDC/ITL TR-19-6	(2019) A/E/C Graphics Standard, Release 2.1
ERDC/ITL TR-19-7	(2019) A/E/C CAD Standard - Release 6.1

U.S. DEPARTMENT OF DEFENSE (DOD)

UFC 1-300-08	(2023) Criteria for Transfer and Acceptance of DoD Real Property

1.2 DEFINITIONS

1.2.1 As-Built Drawings

As-built drawings are the marked-up drawings, maintained by the Contractor on-site, that depict actual conditions and deviations from the Contract Documents. These deviations and additions may result from coordination required by, but not limited to: contract modifications; official responses to submitted Requests for Information (RFI's); direction from the Contracting Officer; design that is the responsibility of the Contractor, and differing site conditions. Maintain the as-builts throughout construction as red-lined hard copies on site and red-lined PDF files. These files serve as the basis for the creation of the record drawings.

1.2.2 Record Drawings

The record drawings are the final compilation of actual conditions reflected in the as-built drawings.

1.3 SOURCE DRAWING FILES

Request the full set of electronic drawings (in accordance with 01 33 00), in the source format, for Record Drawing preparation, after award and at least 30 days prior to required use.

1.3.1 Terms and Conditions

Data contained on these electronic files must not be used for any purpose other than as a convenience in the preparation of construction drawings and data for the referenced project. Any other use or reuse is at the sole risk of the Contractor and without liability or legal exposure to the Government. The Contractor must make no claim and waives to the fullest extent permitted by law, any claim or cause of action of any nature against the Government, its agents or sub consultants that may arise out of or in

connection with the use of these electronic files. The Contractor must, to the fullest extent permitted by law, indemnify and hold the Government harmless against all damages, liabilities or costs, including reasonable attorney's fees and defense costs, arising out of or resulting from the use of these electronic files.

These electronic CAD drawing files are not construction documents. Differences may exist between the CAD files and the corresponding construction documents. The Government makes no representation regarding the accuracy or completeness of the electronic CAD files, nor does it make representation to the compatibility of these files with the Contractor hardware or software. In the event that a conflict arises between the signed and sealed construction documents prepared by the Government and the furnished Source drawing files, the signed and sealed construction documents govern. The Contractor is responsible for determining if any conflict exists. Use of these Source Drawing files does not relieve the Contractor of duty to fully comply with the contract documents, including and without limitation, the need to check, confirm and coordinate the work of all contractors for the project. If the Contractor uses, duplicates or modifies these electronic source drawing files for use in producing construction drawings and data related to this contract, remove all previous indicia of ownership (seals, logos, signatures, initials and dates).

1.4 SUBMITTALS

Government approval is required for submittals with a "G" or [11]8[11] classification. Submittals not having a "G" or [11]8[11] classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Warranty Tags

Spare Parts Data

Warranty Management Plan; G

SD-08 Manufacturer's Instructions

Posted Instructions

SD-10 Operation and Maintenance Data

Operation and Maintenance Manuals; G

SD-11 Closeout Submittals

As-Built Drawings; G

Record Drawings; G

As-Built Record of Equipment and Materials

Warranted Equipment and Materials

Final Approved Shop Drawings; G

Construction Contract Specifications; G

Certification of EPA Designated Items; G

Interim DD FORM 1354; G, AO

High Performance and Sustainable Building (HPSB) Checklist; G

List Of Installed Building Equipment Items For DD Form 1354

1.5 SPARE PARTS DATA

Submit two copies of the Spare Parts Data list.

a. Indicate manufacturer's name, part number, and stock level required for test and balance, pre-commissioning, maintenance and repair activities. List those items that may be standard to the normal maintenance of the system.

b. At acceptance of commissioning, ensure the required stock level is supplied as indicated in subparagraph a for maintenance and repair activities through the facilities warranty period. Provision of spare parts does not relieve the Contractor of responsibilities listed under the contract guarantee provisions.

1.6 QUALITY CONTROL

Additions and corrections to the contract drawings must be equal in quality and detail to that of the originals. Line colors, line weights, lettering, layering conventions, and symbols must conform to ERDC/ITL TR-19-7.

1.7 WARRANTY MANAGEMENT

1.7.1 Warranty Management Plan

Develop a warranty management plan which contains information relevant to RFO 52.246-21 Warranty of Construction. At least 30 days before the planned pre-warranty conference, submit of the warranty management plan. Include within the warranty management plan **all** required actions and documents to assure that the Government receives **all** warranties to which it is entitled. The plan narrative must contain sufficient detail to render it suitable for use by future maintenance and repair personnel, whether tradesmen, or of engineering background, not necessarily familiar with this contract. The term "status" as indicated below must include due date and whether item has been submitted or was accomplished. Submit warranty information, made available during the construction phase, to the Contracting Officer for approval prior to each monthly pay estimate. Assemble approved information in a binder and turn over to the Government upon acceptance of the work. The construction warranty period must begin on the date of project acceptance and continue for the **full** product warranty period. Conduct a joint 4 month and 9 month warranty inspection, measured from time of acceptance; with the Contractor, Contracting Officer and the Customer Representative. The warranty management plan must include, but is not limited to, the following:

a. Roles and responsibilities of personnel associated with the warranty process, including points of contact and telephone numbers within the

organizations of the Contractors, subcontractors, manufacturers or suppliers involved.

b. For each warranty, the name, address, telephone number, and e-mail of each of the guarantor's representatives nearest to the project location.

c. A list and status of delivery of Certificates of Warranty for extended warranty items, including roofs, HVAC balancing, pumps, motors, transformers, and for commissioned systems, such as fire protection and alarm systems, sprinkler systems, and lightning protection systems.

d. Warranted Equipment and Materials list for each warranted equipment, item, feature of construction or system indicating:

(1) Name of item.
(2) Model and serial numbers.
(3) Location where installed.
(4) Name and phone numbers of manufacturers or suppliers.
(5) Names, addresses and telephone numbers of sources of spare parts.
(6) Warranties and terms of warranty. Include one-year overall warranty of construction, including the starting date of warranty of construction. Items which have warranties longer than one year must be indicated with separate warranty expiration dates.
(7) Cross-reference to warranty certificates as applicable.
(8) Starting point and duration of warranty period.
(9) Summary of maintenance procedures required to continue the warranty in force.
(10) Cross-reference to specific pertinent Operation and Maintenance manuals.
(11) Organization, names and phone numbers of persons to call for warranty service.
(12) Typical response time and repair time expected for various warranted equipment.

e. The plans for attendance at the 4 and 9 month post-construction warranty inspections conducted by the Government.

f. Procedure and status of tagging of equipment covered by warranties longer than one year.

g. Copies of instructions to be posted near selected pieces of equipment where operation is critical for warranty or safety reasons.

1.7.2 Performance Bond

The Performance Bond must remain effective throughout the construction period.

a. In the event the Contractor fails to commence and diligently pursue any construction warranty work required, the Contracting Officer will have the work performed by others, and after completion of the work, will charge the remaining construction warranty funds of expenses incurred by the Government while performing the work, including, but not limited to administrative expenses.

b. In the event sufficient funds are not available to cover the construction warranty work performed by the Government at the Contractor's expense, the Contracting Officer **will** have the right to recoup expenses from the bonding company.

c. Following oral or written notification of required construction warranty repair work, respond in a timely manner. Written verification will follow oral instructions. Failure to respond will be cause for the Contracting Officer to proceed against the Contractor.

1.7.3 Pre-Warranty Conference

Prior to contract completion, and at a time designated by the Contracting Officer, meet with the Contracting Officer to develop a mutual understanding with respect to the requirements of this section. At this meeting, establish and review communication procedures for Contractor notification of construction warranty defects, priorities with respect to the type of defect, reasonable time required for Contractor response, and other details deemed necessary by the Contracting Officer for the execution of the construction warranty In connection with these requirements and at the time of the Contractor's quality control completion inspection, furnish the name, telephone number and address of a licensed and bonded company which is authorized to initiate and pursue construction warranty work action on behalf of the Contractor. This point of contact must be located within the local service area of the warranted construction, be continuously available, and be responsive to Government inquiry on warranty work action and status. This requirement does not relieve the Contractor of any of its responsibilities in connection with other portions of this provision.

1.7.4 Contractor's Response to Construction Warranty Service Requirements

Following oral or written notification by the Contracting Officer, respond to construction warranty service requirements in accordance with the "Construction Warranty Service Priority List" and the three categories of priorities listed below. Submit a report on any warranty item that has been repaired during the warranty period. Include within the report the cause of the problem, date reported, corrective action taken, and when the repair was completed. If the Contractor does not perform the construction warranty within the timeframe specified, the Government will perform the work and back charge the construction warranty payment item established.

a. First Priority Code 1. Perform onsite inspection to evaluate situation, and determine course of action within 4 hours, initiate work within 6 hours and work continuously to completion or relief.

b. Second Priority Code 2. Perform onsite inspection to evaluate situation, and determine course of action within 8 hours, initiate work within 24 hours and work continuously to completion or relief.

c. Third Priority Code 3. All other work to be initiated within 3 work days and work continuously to completion or relief.

d. The "Construction Warranty Service Priority List'' is as follows:

Code 1-Life Safety Systems
(1) Fire suppression systems.
(2) Fire alarm system(s) in place in the building.

Code 1-Air Conditioning Systems
(3) Recreational support.
(4) Air conditioning leak in part of building, if causing damage.
(5) Air conditioning system not cooling properly.

Code 1-Doors
(6) Overhead doors not operational, causing a security, fire, or safety problem.
(7) Interior, exterior personnel doors or hardware, not functioning properly, causing a security, fire, or safety problem.

Code 3-Doors
(8) Overhead doors not operational.
(9) Interior/exterior personnel doors or hardware not functioning properly.

Code 1-Electrical
(10) Power failure (entire area or any building operational after 1600 hours).
(11) Security lights
(12) Smoke detectors

Code 2-Electrical
(13) Power failure (no power to a room or part of building).
(14) Receptacle and lights (in a room or part of building).

Code 3-Electrical
(15) Street lights.

Code 1-Gas
(16) Leaks and breaks.
(17) No gas to family housing unit or cantonment area.

Code 1-Heat
(18) Area power failure affecting heat.
(19) Heater in unit not working.

Code 2-Kitchen Equipment
(20) Dishwasher not operating properly.
(21) All other equipment hampering preparation of a meal.

Code 1-Plumbing
(22) Hot water heater failure.
(23) Leaking water supply pipes.

Code 2-Plumbing
(24) Flush valves not operating properly.
(25) Fixture drain, supply line to commode, or any water pipe leaking.
(26) Commode leaking at base.

Code 3 -Plumbing
(27) Leaky faucets.

Code 3-Interior
(28) Floors damaged.
(29) Paint chipping or peeling.
(30) Casework.

Code 1-Roof Leaks
(31) Temporary repairs will be made where major damage to property is occurring.

Code 2-Roof Leaks

(32) Where major damage to property is not occurring, check for location of leak during rain and complete repairs on a Code 2 basis.

Code 2-Water (Exterior)
(33) No water to facility.

Code 2-Water (Hot)
(34) No hot water in portion of building listed.

Code 3-All other work not listed above.

1.7.5 Warranty Tags

At the time of installation, tag each warranted item with a durable, oil and water resistant tag approved by the Contracting Officer. Attach each tag with a copper wire and spray with a silicone waterproof coating. Also, submit two record copies of the warranty tags showing the layout and design. The date of acceptance and the QC signature must remain blank until the project is accepted for beneficial occupancy. Show the following information on the tag.

Type of	
Model number	
Serial number	
Contract number	
Warranty period from/to	
Inspector's signature	
Construction Contractor	
Address	
Telephone number	
Warranty contact	
Address	
Telephone number	
Warranty response time	
WARNING - PROJECT PERSONNEL TO PERFORM ONLY OPERATIONAL MAINTENANCE DURING THE WARRANTY PERIOD.	

PART 2 PRODUCTS

2.1 RECORD DRAWINGS

Prepare the CAD drawing files in the current version of Autocad compatible with a Windows 11 operating system.

2.1.1 Additional Drawings

If additional drawings are required, prepare them using the specified electronic file format applying ERDC/ITL TR-19-7 and ERDC/ITL TR-19-6. The title block and drawing border to be used for any new final record drawings must be identical to that used on the contract drawings.

2.1.1.1 Sheet Numbers and File Names

If a sheet needs to be added between two sequential sheets, append a Supplemental Drawing Designator in accordance with ERDC/ITL TR-19-7 Adding a drawing sheet, and ERDC/ITL TR-19-6 Adding or deleting drawing sheets and index sheet procedures.

2.2 CERTIFICATION OF EPA DESIGNATED ITEMS

Submit the Certification of EPA Designated Items as required by FAR 52.223-9 Estimate of Percentage of Recovered Material Content for EPA Designated Items and RFO 52.223-17 Affirmative Procurement of EPA designated items in Service and Construction Contracts. Include on the certification form the following information: project name, project number, Contractor name, license number, Contractor address, and certification. The certification will read as follows and be signed and dated by the Contractor. "I hereby certify the information provided herein is accurate and that the requisition/procurement of all materials listed on this form comply with current EPA standards for recycled/recovered materials content. The following exemptions may apply to the non-procurement of recycled/recovered content materials:

a. The product does not meet appropriate performance standards;

b. The product is not available within a reasonable time frame;

c. The product is not available competitively (from two or more sources);

d. The product is only available at an unreasonable price (compared with a comparable non-recycled content product)."

Record each product used in the project that has a requirement or option of containing recycled content in accordance with SECTION 01 33 29 SUSTAINABILITY REQUIREMENTS AND REPORTING, noting total price, total value of post-industrial recycled content, total value of post-consumer recycled content, exemptions (a, b, c, or d, as indicated), and comments. Recycled content values may be determined by weight or volume percent, but must be consistent throughout.

2.3 PDF AS-BUILT FILES

Provide electronic PDF ''plots" of all contract drawings sheets associated with the as-built drawing submittal. Compile and organize the PDF set to match the contract drawings. Bookmark and label the pages of the PDF file in accordance with Section 01 33 16.00 10 DESIGN DATA (DESIGN AFTER AWARD).

2.4 REDLINES AND MARKUPS

Provide PDFs of the current working redlines and/or markups complying with the as-builts drawing and markup requirements contained in this specification.

PART 3 EXECUTION

3.1 AS-BUILT DRAWINGS

Provide and maintain two black line print copies of the PDF contract drawings for As-Built Drawings. Maintain the as-builts throughout

construction as red-lined hard copies on site and red-lined PDF files. Submit As-Built Drawings 30 days prior to Beneficial Occupancy Date (BOD)

3.1.1 Markup Guidelines

Make comments and markup the drawings complete without reference to letters, memos, or materials that are not part of the As-Built drawing. Show what was changed, how it was changed, where item(s) were relocated and change related details. These working as-built markup prints must be neat, legible and accurate as follows:

a. Use base colors of red, green, and blue. Color code for changes as follows:

(1) Special (Blue) - Items requiring special information, coordination, or special detailing or detailing notes.

(2) Deletions (Red) - Over-strike deleted graphic items (lines), lettering in notes and leaders.

(3) Additions (Green) - Added items, lettering in notes and leaders.

b. Provide a legend **if** colors other than the "base" colors of red, green, and blue are used.

c. Add and denote any additional equipment or material facilities, service lines, incorporated under As-Built Revisions if not already shown in legend.

d. Use frequent written explanations on markup drawings to describe changes. Do not totally rely on graphic means to convey the revision.

e. Use legible lettering and precise and clear digital values when marking prints. Clarify ambiguities concerning the nature and application of change involved.

f. Wherever a revision is made, also make changes to related section views, details, legend, profiles, plans and elevation views, schedules, notes and call out designations, and mark accordingly to avoid conflicting data on all other sheets.

g. For deletions, cross out **all** features, data and captions that relate to that revision.

h. For changes on small-scale drawings and in restricted areas, provide large-scale inserts, with leaders to the applicable location.

i. Indicate one of the following when attaching a print or sketch to a markup print:

(1) Add an entire drawing to contract drawings

(2) Change the contract drawing to show changes on the drawing.

(3) Provided for reference only to further detail the initial design.

j. Incorporate all shop and fabrication drawings into the markup drawings.

3.1.2 As-Built Drawings Content

Revise As-Built Drawings in accordance with ERDC/ITL TR-19-6 and ERDC/ITL TR-19-7. Keep these working as-built markup drawings current on a weekly basis and at least one set available on the jobsite at all times. Changes from the contract drawings which are made during construction or additional information which might be uncovered in the course of construction must be accurately and neatly recorded as they occur by means of details and notes. Submit the working as-built markup drawings for approval prior to submission of each monthly pay estimate. For failure to maintain the working and final record drawings as specified herein, the Contracting Officer will withhold 10 percent of the monthly progress payment until approval of updated drawings. Show on the as-built drawings, but not limited to, the following information:

a. The actual location, kinds and sizes of all sub-surface utility lines. In order that the location of these lines and appurtenances may be determined in the event the surface openings or indicators become covered over or obscured, show by offset dimensions to two permanently fixed surface features the end of each run including each change in direction on the record drawings. Locate valves, splice boxes and similar appurtenances by dimensioning along the utility run from a reference point. Also record the average depth below the surface of each run.

b. The location and dimensions of any changes within the building structure.

c. Layout and schematic drawings of electrical circuits and piping.

d. Correct grade, elevations, cross section, or alignment of roads, earthwork, structures or utilities if any changes were made from contract plans.

e. Changes in details of design or additional information obtained from working drawings specified to be prepared or furnished by the Contractor; including but not limited to shop drawings, fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment, and foundations.

f. The topography, invert elevations and grades of drainage installed or affected as part of the project construction.

g. Changes or Revisions which result from the final inspection.

h. Where contract drawings or specifications present options, show only the option selected for construction on the working as-built markup drawings.

i. If borrow material for this project is from sources on Government property, or if Government property is used as a spoil area, furnish a contour map of the final borrow pit/spoil area elevations.

j. Systems designed or enhanced by the Contractor, such as HVAC controls, fire alarm, fire sprinkler, and irrigation systems.

k. Changes in location of equipment and architectural features.

1. Modifications.

m. Actual location of anchors, construction and control joints, etc., in concrete.

n. Unusual or uncharted obstructions that are encountered in the contract work area during construction.

o. Location, extent, thickness, and size of stone protection particularly where it will be normally submerged by water.

3.2 RECORD DRAWING FILES

If additional drawings are required, prepare them using the specified electronic file format applying ERDC/ITL TR-19-7 and ERDC/ITL TR-19-6. The title block and drawing border to be used for any new final record drawings must be identical to that used on the contract drawings. Accomplish additions and corrections to the contract drawings using CAD files. Provide all program files and hardware necessary to prepare final PDF record drawings. The Contracting Officer will review final PDF record drawings for accuracy and return them to the Contractor for required corrections, changes, additions, and deletions.

3.2.1 Rename the CAD Drawing files

Rename the CAD Drawing files using the contract number as the Project Code field,(e.g., W91238-15-C-10A-102.DWGDGN) as instructed in the Pre-Construction conference. Use only those renamed files for the Marked-up changes. Make all changes on the layer/level as the original item.

a. For AutoCAD files (DWG), enter all as-built delta changes and notations on the AS-BUILT layer.
b. When final revisions have been completed, show the wording "RECORD DRAWING AS-BUILTS" followed by the name of the Contractor in letters at least 3/16 inch high on the cover sheet drawing. Date RECORD DRAWING AS-BUILTS" drawing revisions in the revision block.

c. Within days after Government approval of all of the working record drawings for a phase of work, prepare the final CAD record drawings for that phase of work and submit PDF drawing files and two sets of prints for review and approval. The Government will promptly return one set of prints annotated with any necessary corrections. Within days revise the CAD files accordingly at no additional cost and submit one set of final prints for the completed phase of work to the Government. Within days of substantial completion of all phases of work, submit the final record drawing package for the entire project. Submit one set of electronic CAD files, and one set of the approved working record PDF and or program files with two sets of prints. The CAD files must be complete in all details and identical in form and function to the CAD drawing files supplied by the Government. Prepare AutoCAD files for transmittal using e-Transmit. Make any transactions or adjustments necessary to accomplish this. The Government reserves the right to reject any drawing files it deems incompatible with the customer's CAD system. Paper prints, drawing files and storage media submitted will become the property of the Government upon final approval. Failure to submit final record PDF drawing files, CAD files and marked prints as specified will be cause for withholding any payment due under this contract. Approval and acceptance of final record drawings must be accomplished before final payment is made.

3.3 RECORD DRAWINGS

Prepare final record drawings after the completion of each definable phase of work as listed in the Contractor Quality Control Plan (such as Foundations, Utilities, or Structural Steel as appropriate for the project). Transfer the changes from the approved working as-built markup drawings to the original electronic CAD drawing files. Modify the as-built CAD drawing files to correctly show the features of the project as-built by bringing the working CAD drawing set into agreement with approved working as-built markup drawings, and adding such additional drawings as may be necessary. Refer to ERDC/ITL TR-19-6. Jointly review the working as-built markup drawings with printouts from working as-built CAD drawing PDF files for accuracy and completeness. Monthly review of working as-built CAD drawing PDF file printouts must cover all sheets revised since the previous review. These PDF drawing files are part of the permanent records of this project. Any drawings damaged or lost must be satisfactorily replaced at no expense to the Government.

Drawing revisions (include within change order price the cost to change working and final record drawings to reflect revisions) and compliance with the following procedures.

a. Follow directions in the revision for posting descriptive changes.

b. The revision delta size must be 5/16 inch unless the area where the delta is to be placed is crowded. Use a smaller size delta for crowded areas.

c. Place a revision delta at the location of each deletion.

d. For new details or sections which are added to a drawing, place a revision delta by the detail or section title.

e. For minor changes, place a revision delta by the area changed on the drawing (each location).

f. For major changes to a drawing, place a revision delta by the title of the affected plan, section, or detail at each location.

g. For changes to schedules or drawings, place a revision delta either by the schedule heading or by the change in the schedule.

3.3.1 Final Record Drawing Package

Submit the final record PDF and CAD drawings package for the entire project within 20 days of substantial completion of all phases of work. Submit one set of ANSI D size PDF and CAD files, two sets of ANSI D size prints and one set of the approved working record drawings. The package must be complete in all details and identical in form and function to the contract drawing files supplied by the Government.

3.4 FINAL APPROVED SHOP DRAWINGS

Submit final approved project shop drawings 30 days after transfer of the completed facility.

3.5 CONSTRUCTION CONTRACT SPECIFICATIONS

Submit final PDF file record construction contract specifications, including revisions thereto, 30 days after transfer of the completed facility.

3.6 AS-BUILT RECORD OF EQUIPMENT AND MATERIALS

Furnish one copy of preliminary record of equipment and materials used on the project 15 days prior to final inspection. This preliminary submittal will be reviewed and returned2 days after final inspection with Government comments. Submit Two sets of final record of equipment and materials 10 days after final inspection. Key the designations to the related area depicted on the contract drawings. List the following data:

RECORD OF DESIGNATED EQUIPMENT AND MATERIALS DATA				
Description	Specification Section	Manufacturer and Catalog, Model, and Serial Number	Composition and Size	Where Used

3.7 OPERATION AND MAINTENANCE MANUALS

Provide project operation and maintenance manuals as specified in Section 01 78 23 OPERATION AND MAINTENANCE DATA.Provide four electronic copies of the Operation and Maintenance Manual files and one hard copy of the Operation and Maintenance Manuals. Submit to the Contracting Officer for approval within 30 calendar days of the Beneficial Occupancy Date (BOD). Update and resubmit files for final approval at BOD.

3.8 CLEANUP

Leave premises "broom clean." Clean interior and exterior glass surfaces exposed to view; remove temporary labels, stains and foreign substances; polish transparent and glossy surfaces; vacuum carpeted and soft surfaces. Clean equipment and fixtures to a sanitary condition. Replace filters of operating equipment. Clean debris from roofs, gutters, downspouts and drainage systems. Sweep paved areas and rake clean landscaped areas. Remove waste and surplus materials, rubbish and construction facilities from the site..

3.9 REAL PROPERTY RECORD

Refer to UFC 1-300-08 for instruction on completing the DD FORM 1354. Contact the Contracting Officer for any project specific information necessary to complete the DD FORM 1354.

3.9.1 Interim DD FORM 1354

Near the completion of Project, but a minimum of 60 days prior to final acceptance of the work, complete DD FORM 1354 and submit an accounting of all installed property with Interim DD FORM 1354. Include any additional

assets, improvements, and alterations from the Draft DD FORM 1354.

3.9.2 Completed DD FORM 1354

Attach the Real Property receiving Component's completed High Performance and Sustainable Building (HPSB) Checklist for each applicable building to the completed DD 1354, in accordance with Section 01 33 29 SUSTAINABILITY REQUIREMENTS AND REPORTING. For convenience, a blank fillable PDF DD FORM 1354 may be obtained at the following link: www.esd.whs.mil/Portals/54/Documents/DD/forms/dd/ddl354.pdf

Submit the completed List of Installed Building Equipment items for DD FORM 1354. Attach this list to the updated DD FORM 1354.

-- End of Section

SECTION 01 78 23

OPERATION AND MAINTENANCE DATA
05/23, CHG 2: 11/25

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE GUIDELINE 1.4	(2019) Preparing Systems Manuals for Facilities

ASTM INTERNATIONAL (ASTM)

ASTM E1971	(2024) Standard Guide for Stewardship for the Cleaning of Commercial and Institutional Buildings
ASTM E2166	(2016; R 2023) Standard Practice for Organizing and Managing Building Data

1.2 SUBMITTALS

Government approval is required for submittals with a "G" or [11]8[11] classification. Submittals not having a "G" or [11]8[11] classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-10 Operation and Maintenance Data

Facility Data Workbook; G,

Training Plan; G,

Training Outline; G,

Training Content; G,

Operation And Maintenance Manual, Progress Submittal; G,

Operation And Maintenance Manual, Prefinal Submittal; G,

Operation And Maintenance Manual, Final Submittal; G,

SD-11 Closeout Submittals

Training Video Recording; G,

Validation of Training Completion; G,

Training Plan; G,

Record Drawings And Utility Systems; G,

1.3 MEETINGS

To assure that Operation and Maintenance Manual and Facility Data Workbook requirements are being met through the duration of the project, organize the following meetings and discuss the subsequent topics:

1.3.1 Post-Award Kickoff Meeting and Pre-Construction Meeting

At a minimum, discuss the following:

a. The requirement for Operation and Maintenance Manuals and Facility Data deliverables under this contract including coordination meetings

b. Processes and method of gathering Facility Data information during construction

c. Primary roles and responsibilities associated with the development and delivery of the Operation and Maintenance Manuals and Facility Data deliverables, and

d. Identify and agree upon a date and attendance list for the meetings described below:

1.3.2 Operation and Maintenance Manual and Facility Data Workbook Coordination Meeting

Facilitate a meeting after the Pre-Construction Meeting and a Post-Award Kickoff Meeting prior to the submission of the Operation and Maintenance Manual Progress Submittal. Meeting attendance must include the Contractor's Operation and Maintenance Manual and Facility Data Workbook Preparer, Designer of Record (DOR), Quality Control Manager, the Government's Design Manager (DM), Contracting Officer's Representative, and Government's facility data reviewer. Include any Mechanical, Electrical, and Fire Protection Sub-Contractors.

The purpose of this meeting is to reach a mutual understanding of the scope of work concerning the contract requirements for Operation and Maintenance Manual and coordinate the efforts necessary by both the Government and Contractor to ensure an accurate collection, preparation and timely Government review of Operation and Maintenance Manual.

1.3.3 Submittal Coordination Meeting

Facilitate a meeting following submission and Government review of each design or progress submittal of the Operation and Maintenance Manual and Facility Data Workbook.

a. Include personnel from the Coordination meeting and any additional personnel identified.

b. The purpose of this meeting is to demonstrate ongoing compliance with the requirements identified in this specification. Discuss Government

review comments and unresolved items preventing completion and Government approval of the Operation and Maintenance Manuals and Facility Data Workbook (FDW)

c. The applicable deliverables, along with Government remarks associated with review of these submittals serve as the primary guide and agenda for this meeting.

1.4 FACILITY DATA WORKBOOK

Develop an editable, electronic spreadsheet based on the equipment in the Operation and Maintenance Manuals that contains the information required to start a preventive maintenance program. As a minimum, provide Facility Data Workbook as a list of system equipment, location installed, warranty expiration date, manufacturer, model, and serial number.

1.5 OPERATION AND MAINTENANCE MANUAL MEDIA

Assemble Operation and Maintenance Manual into an electronically bookmarked file using the most current version of Adobe Acrobat or similar software capable of producing PDF file format. Provide compact disks (CD) or data digital versatile disk (DVD) as appropriate, so that each one contains operation, maintenance and record files, project record documents, and training videos. Include a complete bookmarked operation and maintenance directory.

1.5.1 CD or DVD Label and Disk Holder or Case

Provide the following information on the disk label and disk holder or case:

a. Building Number

b. Project Title

c. Activity and Location

d. Construction Contract Number

e. Prepared For: (Contracting Agency)

f. Prepared By: (Name, title, phone number and email address)

g. Include the disk content on the disk label

h. Date

i. Virus scanning program used

1.5.2 O&M Manual Tabbed Hard Copy

Provide a hard copy of the O&M manual upon completion of the project. Provide tabs for each section and subsection for ease of navigation by the user.

1.6 O&M MANUAL CONTENT

Organize the bookmarked Operation and Maintenance Manual into the following Parts in accordance with ASHRAE GUIDELINE 1.4, and as modified and detailed below. Word template for O&M Manual is available at: www.wbdg.org/dod/ufgs/ufgs-01-78-23.

1.6.1 Part 1: Executive Summary

Provide a summary of the information found in the O&M manual including the purpose of the manual and a description of the manual's organization.

1.6.2 Part 2: Facility Design and Construction

1.6.2.1 General Facility and Systems Description

Provide an overview of the intent for design and use of the facility. Provide a PDF of the Record Drawings prepared in accordance with 01 78 00 CLOSEOUT SUBMITTALS and bookmarked using the sheet title and sheet number. Include uncluttered 11 by 17 inches floor plans with room numbers, type or function of space, and overall facility dimensions on the floor plans. Do not include items such as construction instructions, references, or frame numbers.

Detail the overall dimensions of the facility, number of floors, foundation type, expected number of occupants, and facility Category Code list and generally describe all the facility systems and any special building features (for example, HVAC Controls, Sprinkler Systems, Cranes, Elevators, and Generators). Include photographs marked up and labeled to show key operating components and the overall facility appearance.

1.6.2.2 Basis of Design

Provide a copy of the contract Basis of Design.

1.6.2.3 Contract Documents, RFP, Amendments, and Modifications

Provide the contract construction documents complete, to include specifications, drawings, Request for Proposal, amendments, and modifications.

1.6.2.4 Room Inventory of Real Property and Finishes

Provide a list of installed equipment furnished under this contract. Include all information usually listed on manufacturer's name plate. Include, as applicable, the following information for each piece of equipment installed: description of item, all dimensions, location by room number, model number, serial number, capacity, name and address of manufacturer, name and address of equipment supplier, condition, spare parts list, manufacturer's catalog, and warranty. Real property includes, but is not limited to, floor coverings, wall surfaces, ceiling surfaces, windows, roofing, HVAC filters, plumbing fixtures, and lighting fixtures. Submit the final list 30 days after transfer of the completed facility.

Include spatial data defining actual net square footage and data of each room. Also include the room finish schedule including room names and numbers. Include schedules in the construction drawings in the room inventory. Add a column to each schedule to record what was provided by the contractor during construction. Provide a PDF of room inventory. Key the designations to the related area depicted on the contract drawings. List the following data:

RECORD OF DESIGNATED EQUIPMENT AND MATERIALS DATA				
Description	Specification Section	Manufacturer and Catalog, Model, and Serial Number	Composition and Size	Where Used

1.6.3 Part 3: Facilities, Systems, and Assemblies Information

1.6.3.1 Organization

Bookmark information in this section using the current version of ASTM E2166 Uniformat II, UFGS numbers, and document type as outlined in the example below. Bookmark/tab each item to the third level for easy navigation of the manual.

Example as shown in Table below:

PARTS AND SUBPART NUMBERING
3.1 B20 EXTERIOR CLOSURE (System)
3.1.1 B2030 EXTERIOR DOORS (Subsystem)
3.1.1.1 B2030110 GLAZED DOORS (Component)
3.1.1.1.1 Applicable specifications List in UFGS Format
3.1.1.1.2 Manufacturer's Operations and Maintenance Data
3.1.1.1.3 Approved Submittal
3.1.1.1.4 Coordination/Shop Drawings
3.1.1.1.5 Sequence of Operation for Operating Equipment
3.1.1.1.6 Testing Equipment Information and Performance Data
3.1.1.1.7 Routine Maintenance Requirements
3.1.1.1.8 Repair Procedures
3.1.1.1.9 Emergency Procedures & Locations of Applicable
3.1.1.1.10 Warranties
3.1.1.1.11 Record Drawings and Utility Systems
3.1.1.1.12 Contractor/ Supplies Listing and Contact Information

1.6.3.2 Related Specifications

Reference each specification related to the subsystem in this section, and locate the actual specification section in Part 2 of the O&M Manual. List

specifications in table format as shown in the below example.

UFGS Number	Specification Title	Page Spec Begins in Part 2

1.6.3.3 Manufacturer's Operations and Maintenance Data

Provide a copy of all manufacturer specifications and cutsheets. Provide text-searchable, high-quality document files from the manufacturer's online or electronic documentation. Color documents are preferred. Provide documents specific to the product(s) installed under this Contract. Provide identification and coverage for the parts of each component, assembly, subassembly, and accessory of the end items subject to replacement. Provide Uniformat II Level 3 identification for D20, D30, D40 installed equipment. When possible, do not submit document files containing multiple product catalogs from the same manufacturer, or product data from multiple manufacturers in the same files. Provide documents directly from the manufacturer whenever possible. Do not provide scanned copies of hardcopy documents. Provide identification and coverage for the parts of each component, assembly, subassembly, and accessory of the end items subject to replacement. Include special hardware requirements, such as requirement to use high-strength bolts and nuts. Identify parts by make, model, serial number, and source of supply to allow reordering without further identification. Provide clear and legible illustrations, drawings, and exploded views to enable easy identification of the items. When illustrations omit the part numbers and description, both the illustrations and separate listing must show the index, reference, or key number that will cross-reference the illustrated part to the listed part. Group the parts shown in the listings by components, assemblies, and subassemblies in accordance with the manufacturer's standard practice. Parts data may cover more than one model or series of equipment, components, assemblies, subassemblies, attachments, or accessories, such as typically shown in a master part catalog.

1.6.3.4 Approved Submittals and Certificates

Provide a copy of all submittals documented with the required approval as applicable for each UFGS specification listed in the table outlined in applicable specifications. Include copies of SD-07 Certificates submittals documented with the required approval, SD-08 Manufacturer's Instructions submittals documented with the required approval, and SD-10 Operation and Maintenance Data submittals documents with the required approval.

1.6.3.5 Approved Coordination/Shop Drawings

Drawings, diagrams and schedules specifically prepared to illustrate some portion of the work. Diagrams and instructions from a manufacturer or fabricator for use in producing the product and as aids to the Contractor for integrating the product or system into the project. Drawings prepared by or for the Contractor to show how multiple systems and interdisciplinary work will be coordinated.

1.6.4 Sequence of Operation for Operating Equipment

Provide record one-line diagrams for each floor, delineating mechanical equipment location within the building. Provide specific instructions, procedures, and illustrations for the following phases of operation for the installed model and features of each system:

1.6.4.1 Safety Precautions and Hazards

List personnel hazards and equipment or product safety precautions for operating conditions. List **all** residual hazards identified in the Activity Hazard Analysis provided under Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS. Provide recommended safeguards for each identified hazard. Specify if any certifications or licenses are required to operate the equipment.

1.6.4.2 Operator Prestart

Provide procedures required to install, set up, and prepare each system for use.

1.6.4.3 Startup, Shutdown, and Post-Shutdown Procedures

Provide narrative description for Startup, Shutdown and Post-shutdown operating procedures including the control sequence for each procedure.

1.6.4.4 Normal Operations

Provide Control Diagrams with data to explain operation and control of systems and specific equipment. Provide narrative description of Normal Operating Procedures.

1.6.4.5 Emergency Operations

Provide Emergency Procedures for equipment malfunctions to permit a short period of continued operation or to shut down the equipment to prevent further damage to systems and equipment. Provide Emergency Shutdown Instructions for fire, explosion, spills, or other foreseeable contingencies. Provide guidance and procedures for emergency operation of utility systems including required valve positions, valve locations and zones or portions of systems controlled.

1.6.4.6 Operator Service Requirements

Provide instructions for services to be performed by the operator such as lubrication, adjustment, inspection, and recording gauge readings.

1.6.4.7 Environmental Conditions

Provide a list of Environmental Conditions (temperature, humidity, and other relevant data) that are best suited for the operation of each product, component or system. Describe conditions under which the item equipment should not be allowed to run.

1.6.4.8 Operating Log

Provide forms, sample logs, and instructions for maintaining necessary operating records.

1.6.4.9 Additional Requirements for Equipment Control Systems

Provide Data Package 5 and the following for all control systems:

a. Provide a narrative description on how to perform and apply functions, features, modes, and other operations, including unoccupied operation, seasonal changeover, manual operation, and alarms. Include detailed technical manual for programming and customizing control loops and algorithms.

b. Submit complete controls equipment schedules, full as-built sequence of operations, wiring and logic diagrams, Input/Output Tables, equipment schedules, copies of checkout tests and calibrations performed by the Contractor (not Cx tests), and all associates information.

c. Full points list. Provide a listing of rooms with the following information for each room:

(1) Floor

(2) Room number

(3) Room name

(4) Air handler unit ID

(5) Reference drawing number

(6) Air terminal unit tag ID

(7) Heating or cooling valve tag ID

(8) Minimum cfm

(9) Maximum cfm

d. Full print out of all schedules and set points after testing and acceptance of the system.

e. Full as-built print out of software program.

f. Marking of system sensors and thermostats on the as-built floor plan and mechanical drawings with their control system designations.

1.6.4.10 Testing Equipment Information and Performance Data

Include information on test equipment required to perform specified tests and on special tools needed for the operation, maintenance, and repair of components. Provide final set points.

Include completed prefunctional checklists, functional performance test forms, and monitoring reports. Include recommended schedule for retesting and blank test forms. Provide final set points.

1.6.5 Routine Maintenance Requirements

1.6.5.1 Preventive Maintenance Plan, Schedule, and Procedures

Provide manufacturer's schedule for routine preventive maintenance,

inspections, condition monitoring (predictive tests) and adjustments required to ensure proper and economical operation and to minimize repairs. Provide instructions stating when the systems should be retested. Provide manufacturer's projection of preventive maintenance work-hours on a daily, weekly, monthly, and annual basis including requirements by type of activity. For periodic calibrations, provide manufacturer's specified frequency and procedures for each separate operation.

a. Define the anticipated time required to perform each test (work-hours), test apparatus, number of personnel identified by responsibility, and a testing validation procedure permitting the record operation capability requirements within the schedule. Provide a remarks column for the testing validation procedure referencing operating limits of time, pressure, temperature, volume, voltage, current, acceleration, velocity, alignment, calibration, adjustments, cleaning, or special system notes. Delineate procedures for preventive maintenance, inspection, adjustment, lubrication and cleaning necessary to minimize repairs.

b. Repair requirements must inform operators how to check out, troubleshoot, repair, and replace components of the system. Include electrical and mechanical schematics and diagrams and diagnostic techniques necessary to enable operation and troubleshooting of the system after acceptance.

1.6.5.2 Lubrication Data

Include the following preventive maintenance lubrication data, in addition to instructions for lubrication required under paragraph OPERATOR SERVICE REQUIREMENTS:

a. A table showing recommended lubricants for specific temperature ranges and applications.

b. Charts with a schematic diagram of the equipment showing lubrication points, recommended types and grades of lubricants, and capacities. Provide procedural instructions for Oil Sampling for all equipment.

c. A Lubrication Schedule showing service interval frequency.

1.6.6 Repair Procedures

Provide instructions and a list of tools required to repair or restore the product or equipment to proper condition or operating standards. Provide manufacturer's recommended procedures and instructions for correcting problems and making repairs for the installed model and features of each system. Include potential environmental and indoor air quality impacts of recommended maintenance procedures and materials. Specify if any certifications or licenses are required to repair the equipment.

1.6.6.1 Troubleshooting Guides and Diagnostic Techniques

Provide step-by-step procedures to promptly isolate the cause of typical malfunctions. Describe clearly why the checkout is performed and what conditions are to be sought. Identify tests or inspections and test equipment required to determine whether parts and equipment may be reused or require replacement.

1.6.6.2 Wiring Diagrams and Control Diagrams

Provide point-to-point drawings of wiring and control circuits including factory-field interfaces. Provide a complete and accurate depiction of the actual job specific wiring and control work. On diagrams, number electrical and electronic wiring and pneumatic control tubing and the terminals for each type, identically to actual installation configuration and numbering.

1.6.6.3 Removal and Replacement Instructions

Provide step-by-step procedures and a list of required specialty tools and supplies for removal, replacement, disassembly, and assembly of components, assemblies, subassemblies, accessories, and attachments. Provide tolerances, dimensions, settings and adjustments required. Use a combination of text and illustrations.

1.6.6.4 Repair Work-Hours

Provide manufacturer's projection of repair work-hours including requirements by type of craft. Identify, and tabulate separately, repair that requires the equipment manufacturer to complete or to participate.

1.6.6.5 Warranty Information

List and explain the various warranties and clearly identify the servicing and technical precautions prescribed by the manufacturers or contract documents in order to keep warranties in force. Identify if replacement of a subassembly, attachment or accessory requires the entire assembly to be replaced. Include warranty information for primary components of the system. Provide copies of warranties required by Section 01 78 00 CLOSEOUT SUBMITTALS.

1.6.6.6 Extended Warranty Information

List all warranties for products, equipment, components, and sub-components whose duration exceeds one year. For each warranty listed, indicate the applicable specification section, duration, start date, end date, and the point of contact for warranty fulfillment. Also, list or reference the specific operation and maintenance procedures that must be performed to keep the warranty valid. Provide copies of warranties required by Section 01 78 00 CLOSEOUT SUBMITTALS.

1.6.6.7 Record Drawings and Utility Systems

The record drawings are the final compilation of actual conditions reflected in the as-built drawings. Provide record drawings as outlined in 01 78 00 CLOSEOUT SUBMITTALS.

Using Record Source Drawings, show and document details of the actual installation of the utility systems, annotate and highlight the Operation and Maintenance information. Provide the following drawings at a large enough scale to differentiate designated isolation units from surrounding valves and switches.

1.6.6.8 Personnel Training Requirements

Provide information available from the manufacturers that is needed for use in training designated personnel to properly operate and maintain the

equipment and systems.

1.6.6.9 Contractor/ Supplier Listing and Contact Information

Provide a list that includes the name, address, telephone number, email and website of the General Contractor and each Subcontractor who installed the product or equipment, or system. For each item, also provide the name address and telephone number of the manufacturer's representative and service organization that can provide replacements most convenient to the project site. Provide the name, address, and telephone number of the product, equipment, and system manufacturers.

1.6.7 Part 4: Facility Operations

1.6.7.1 Completed Facility Operating Plan

Provide a plan that documents that procedures for the operation of systems and assemblies in the facility. The systems that should be included in the Operating Plan include, but are not limited to:

a. Electrical systems and equipment

b. Mechanical systems and equipment

c. Fire Protection systems and equipment

d. Control Systems and equipment

e. Architectural and Structural systems, fixtures, structures, and equipment

f. Vertical transportation such as elevators and escalators

1.6.7.2 Testing Equipment and Special Tool Information

Include information on test equipment required to perform specified tests and on special tools needed for the operation, maintenance, and repair of components. Provide final set points.

1.6.7.3 Testing and Performance Data

Include completed prefunctional checklists, functional performance test forms, and monitoring reports. Include recommended schedule for retesting and blank test forms. Provide final set points.

1.6.7.4 Approved Field Test Reports and Manufacturer's Field Reports

Compile and provide approved Field Test Reports (SD-06) and Manufacturer's Field Reports (SD-09) submittals.

1.6.7.5 Maintenance Plans, Procedures, Checklists, Records, and Spare Parts Inventory

1.6.7.5.1 Maintenance Schedules

Include recommended maintenance schedules for systems and equipment.

1.6.7.5.2 Ongoing Commissioning Operational and Maintenance Record Keeping

Include ongoing commissioning and optimization procedures and documentation to monitor and improve the performance of facility systems.

1.6.7.5.3 Janitorial and Cleaning Plans and Procedures

Include a copy of facility cleaning and janitorial plan with procedures and intended chemicals and equipment.

Provide environmentally friendly cleaning recommendations in accordance with ASTM E1971.

1.6.7.6 Utility Record Drawings

1.6.7.6.1 Utility Schematic Diagrams

Provide a one-line schematic diagram for each utility system such as power, water, wastewater, and gas/fuel. Schematic diagram must show from the point where the utility line is connected to the mainline up to the 5 foot connection point to the facility. Indicate location or area designation for route of transmission or distribution lines; locations of duct banks, manholes/handholes or poles; isolation units such as valves and switches; and utility facilities such as pump stations, lift stations, and substations.

1.6.7.6.2 Enlarged Connection and Cutoff Plans

Provide enlarged floor plans and provide information between the 5 foot utilities connection point and where utilities connect to facility distribution. Enlarge floor plans/elevations of the rooms where the utility enters the building and indicate on these plans the locations of the main interiors and exterior connection and cutoff points for the utilities. Also enlarge floor plans/elevations of the rooms where equipment is located. Include enough information to enable someone unfamiliar with the facility to locate the connection and cutoff points. Indicate designations such as room number, panel number, circuit breaker, or valve number of each utility and equipment connection and cutoff point, and what that connection and cutoff point controls.

1.6.7.6.2.1 Description of Utility Metering and Monitoring Systems

Provide in narrative format a description of the utility metering and monitoring systems. Include locations, function, and related systems.

1.6.7.6.2.2 Procedures for Tracking Utility Use and Reporting

Procedures for usage reporting and tracking in support of establishing and monitoring utility budgets and costs, and in developing annual energy reports.

1.6.7.6.2.3 One-Line Diagrams and Meter Location of System

Provide one-line diagrams and design drawings that highlight meter locations on the site.

1.6.7.6.3 Spare Parts and Supply Lists

Provide lists of spare parts and supplies required for repair to ensure

continued service or operation without unreasonable delays. Special consideration is required for facilities at remote locations. List spare parts and supplies that have a long lead-time to obtain.

1.6.8 Part 5: Training

Provide a copy of training plans used for each type of equipment along with training materials used, arranged in specification sequence. Provide a copy of training records, sign-in sheets, and agendas. Include training and documentation on the updating and continued use of the O&M Manual.

1.6.9 Part 6: Cx Project Report and TAB Report

Provide the final Cx Plan and complete Cx reports with evaluation and testing forms and records for each building system. Include relevant commissioned system assemblies test reports including installers checklists of assemblies. Provide **all** Cx Progress Reports, issues and resolutions logs with resolution or status of each item, and a list of any open items and seasonal or additional testing required.

1.6.10 Part 7: Regulatory Requirements

Provide information describing regulatory and policies compliance requirements or provide a reference to where it is stored.

1.6.11 Part 8: Permits

Provide information requiring frequently asked questions and associated answers or provide a reference to where it is stored.

1.6.12 Part 9: Operations and Maintenance Manual Approval

Provide a signed document stating that the project O&M Manual has been reviewed and confirming agreement with the approach it presents. Include contact information for the signer for coordination of any future changes.

1.7 SCHEDULE OF OPERATION AND MAINTENANCE DATA PACKAGES

Provide the O&M data packages specified in individual technical sections. O&M Data Packages are one of the components of the O&M Manual. The information required in each type of data package follows:

1.7.1 Package Quality

Documents must be fully legible. Operation and Maintenance data must be consistent with the manufacturer's standard brochures, schematics, printed instructions, general operating procedures, and safety precautions.

1.7.2 Data Package 1

a. Safety precautions and hazards

b. Cleaning recommendations

c. Maintenance and repair procedures

d. Warranty information

e. Extended warranty information

f. Contractor information

g. Spare parts and supply list

1.7.3 Data Package 2

a. Safety precautions and hazards

b. Normal operations

c. Environmental conditions

d. Lubrication data

e. Preventive maintenance plan, schedule, and procedures

f. Cleaning recommendations

g. Maintenance and repair procedures

h. Removal and replacement instructions

i. Spare parts and supply list

j. Parts identification

k. Warranty information

1. Extended warranty information

m. Contractor information

1.7.4 Data Package 3

a. Safety precautions and hazards

b. Operator prestart

c. Startup, shutdown, and post-shutdown procedures

d. Normal operations

e. Emergency operations

f. Environmental conditions

g. Operating log

h. Lubrication data

i. Preventive maintenance plan, schedule, and procedures

j. Cleaning recommendations

k. Troubleshooting guides and diagnostic techniques

1. Wiring diagrams and control diagrams

m. Maintenance and repair procedures

n. Removal and replacement instructions

o. Spare parts and supply list

p. Product submittal data

q. O&M submittal data

r. Parts identification

s. Warranty information

t. Extended warranty information

u. Testing equipment and special tool information

v. Testing and performance data

w. Contractor information

x. Field test reports

1.7.5 Data Package 4

a. Safety precautions and hazards

b. Operator prestart

c. Startup, shutdown, and post-shutdown procedures

d. Normal operations

e. Emergency operations

f. Operator service requirements

g. Environmental conditions

h. Operating log

i. Lubrication data

j. Preventive maintenance plan, schedule, and procedures

k. Cleaning recommendations

1. Troubleshooting guides and diagnostic techniques

m. Wiring diagrams and control diagrams

n. Repair procedures

o. Removal and replacement instructions

p. Spare parts and supply list

q. Repair work-hours

r. Product submittal data

s. O&M submittal data

t. Parts identification

u. Warranty information

v. Extended warranty information

w. Personnel training requirements

x. Testing equipment and special tool information

y. Testing and performance data

z. Contractor information

aa. Field test reports

1.7.6 Data Package 5

a. Safety precautions and hazards

b. Operator prestart

c. Start-up, shutdown, and post-shutdown procedures

d. Normal operations

e. Environmental conditions

f. Preventive maintenance plan, schedule, and procedures

g. Troubleshooting guides and diagnostic techniques

h. Wiring and control diagrams

i. Maintenance and repair procedures

j. Removal and replacement instructions

k. Spare parts and supply list

1. Product submittal data

m. Manufacturer's instructions

n. O&M submittal data

o. Parts identification

p. Testing equipment and special tool information

q. Warranty information

r. Extended warranty information

s. Testing and performance data

t. Contractor information

u. Field test reports

v. Additional requirements for HVAC control systems

1.7.7 Changes to Submittals

Provide manufacturer-originated changes or revisions to submitted data if a component of an item is so affected subsequent to acceptance of the O&M Data. Submit changes, additions, or revisions required by the Contracting Officer for final acceptance of submitted data within 30 calendar days of the notification of this change requirement.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 TRAINING

Prior to acceptance of the facility by the Contracting Officer for Beneficial Occupancy, provide comprehensive training for the systems and equipment specified in the technical specifications. The training must be targeted for the building maintenance personnel, and applicable building occupants. Instructors must be well-versed in the particular systems that they are presenting. Address aspects of the Operation and Maintenance Manual submitted in accordance with Section 01 78 00 CLOSEOUT SUBMITTALS. Training must include classroom or field lectures based on the system operating requirements. The location of classroom training requires approval by the Contracting Officer.

3.1.1 Training Plan

Submit a written training plan to the Contracting Officer for approval at least 60 calendar days prior to the scheduled training. Training plan must be approved by the Commissioning Authority (CxA) prior to forwarding to the Contracting Officer. Also, coordinate the training schedule with the Contracting Officer and CxA. Include within the plan the following elements:

a. Equipment included in training

b. Intended audience

c. Location of training

d. Dates of training

e. Objectives

f. Outline of the information to be presented and subjects covered including description

g. Start and finish times and duration of training on each subject

h. Methods (e.g. classroom lecture, video, site walk-through, actual operational demonstrations, written handouts)

i. Instructor names and instructor qualifications for each subject

j. List of texts and other materials to be furnished by the Contractor that are required to support training

k. Description of proposed software to be used for video recording of training sessions.

3.1.2 Training Content

The core of this training must be based on manufacturer's recommendations and the operation and maintenance information. The QC is responsible for overseeing and approving the content and adequacy of the training. Spend 95 percent of the instruction time during the presentation on the OPERATION AND MAINTENANCE DATA. Include the following for each system training presentation:

a. Start-up, normal operation, shutdown, unoccupied operation, seasonal changeover, manual operation, controls set-up and programming, troubleshooting, and alarms.

b. Relevant health and safety issues.

c. Discussion of how the feature or system is environmentally responsive. Advise adjustments and optimizing methods for energy conservation.

d. Design intent.

e. Use of O&M Manual Files.

f. Review of control drawings and schematics.

g. Interactions with other systems.

h. Special maintenance and replacement sources.

i. Tenant interaction issues.

3.1.3 Training Outline

Provide the Operation and Maintenance Manual Files (Bookmarked PDF) and a written course outline listing the major and minor topics to be discussed by the instructor on each day of the course to each trainee in the course. Provide the course outline 14 calendar days prior to the training.

3.1.4 Training Video Recording

Record classroom training session(s) on video. Provide to the Contracting Officer two copies of the training session(s) in DVD video recording format. Capture within the recording, in video and audio, the instructors' training presentations including question and answer periods with the attendees. The recording camera(s) must be attended by a person during the recording sessions to assure proper size of exhibits and projections during the recording are visible and readable when viewed as training.

3.1.5 Unresolved Questions from Attendees

If, at the end of the training course, there are questions from attendees that remain unresolved, the instructor must send the answers, in writing, to the Contracting Officer for transmittal to the attendees, and the training video must be modified to include the appropriate clarifications.

3.1.6 Validation of Training Completion

Ensure that each attendee at each training session signs a class roster daily to confirm Government participation in the training. At the completion of training, submit a signed validation letter that includes a sample record of training for reporting what systems were included in the training, who provided the training, when and where the training was performed, and copies of the signed class rosters. Provide two copies of the validation to the Contracting Officer, and one copy to the Operation and Maintenance Manual Preparer for inclusion into the Manual's documentation.

3.1.7 Quality Control Coordination

Coordinate this training with the QC in accordance with Section 01 45 00 QUALITY CONTROL.

3.2 SUBMITTAL SCHEDULING

3.2.1 Operation and Maintenance Manual, Progress Submittal

Submit the Progress submittal when construction is approximately 50 percent complete, to the Contracting Officer for approval. Provide Operation and Maintenance Manual Files (Bookmarked PDF). Include the elements and portions of system construction completed up to this point. The purpose of this submittal is to verify progress is in accordance with contract requirements as discussed during the Operation and Maintenance Manual Coordination Meeting.

3.2.2 Operation and Maintenance Manual, Prefinal Submittal

Submit the 100 percent submittal of the Operation and Maintenance Prefinal Submittal to the Contracting Officer for approval a minimum of 90 calendar days prior to the Beneficial Occupancy Date (BOD).. This submittal must provide a complete, working document that can be used to operate and maintain the facility. Any portion of the submittal that is incomplete or inaccurate requires the entire submittal to be returned for correction. Any discrepancies discovered during the Government's review of Operation and Maintenance Progress submittal must be corrected prior to the Prefinal submission. The Prefinal Submittal must include Operation and Maintenance Manual Files (Bookmarked PDF).

3.2.3 Operation and Maintenance Manual, Final Submittal

Submit completed Operation and Maintenance Manual Files (Bookmarked PDF) and one hard copy of the Operation and Maintenance Manuals. The Final submittal is due at BOD. Any discrepancies discovered during the Government's review of the Prefinal submittal, including the Field Verification, must be corrected prior to the Final submission.

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SECTION 01 91 00.15

BUILDING COMMISSIONING
05/23, CHG 3: 08/24

PART 1 GENERAL

Building Commissioning is a systematic, quality-focused process for enhancing the delivery of a project that focuses on verifying and documenting that all of the commissioned systems and assemblies are planned, designed, installed, tested, operated, and maintained to meet the project requirements. The purpose is to reduce the cost and performance risks associated with delivering facilities projects, and to increase value to owners, occupants, and users.

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 90.1 - IP	(2019) Energy Standard for Buildings Except Low-Rise Residential Buildings
ASHRAE 180	(2018) Standard Practice for Inspection and Maintenance of Commercial Building HVAC Systems
ASHRAE 202	(2018) Commissioning Process for Buildings and Systems

ASSOCIATED AIR BALANCE COUNCIL (AABC)

ACG Commissioning Guideline	(2005) Commissioning Guideline

NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB)

NEBB Sllll0	(2019) Whole Building Technical Commissioning of New Construction; 2nd Edition

SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)

ANSI/SMACNA 014	(2013) HVAC Systems Commissioning Manual, 2nd Edition

U.S. ARMY CORPS OF ENGINEERS (USACE)

ER 25-345-1	(2019) Commissioning -- Systems Manual

1.2 DEFINITIONS

Commissioning Process (Cx) - a quality-focused process for enhancing the delivery of a project. Refer to ASHRAE 202 for a comprehensive description

of the commissioning process.

Lead Commissioning Specialist (CxC) - The entity who leads, plans, and coordinates the Commissioning Team. The terms Commissioning Provider, Commissioning Firm, Lead Commissioning Specialist, Commissioning Specialist, and Commissioning Authority (CA or CxA) when used by sustainable Third Party Certification (TPC) programs, are interchangeable.

Commissioning Authority - The Government retains the authority for oversight and assurance of the entire commissioning process, and final approval of all commissioning deliverables.

1.3 COMMUNICATION WITH THE GOVERNMENT

The Lead Commissioning Specialist (CxC) must submit all plans, schedules, reports, and documentation directly to the Contracting Officer's Representative concurrent with submission to the Quality Control (QC) Manager.

The Lead Commissioning Specialist must have direct communication with the Contracting Officer's Representative regarding all elements of the commissioning process; however, the Government has no direct contract authority with the Lead Commissioning Specialist.

1.4 SYSTEMS TO BE COMMISSIONED

Coordinate commissioning and quality control activities for the following systems, equipment, and associated controls. System-specific requirements are located in the associated specification sections. Commission the following systems, equipment, and associated controls in accordance with this section and the inspection, testing, and quality control requirements of their respective sections:

Heating, ventilating, air-conditioning, and refrigeration systems (mechanical and passive) and associated controls (HVAC)

Lighting systems: interior and exterior, automatic and manual daylighting controls, occupancy sensing devices, automatic shut-off controls, time switching, and other lighting control devices, and dimming systems

Service hot-water systems and controls

Building Control Systems

Utility Monitoring and Control Systems

Metering and sub-metering

Automatic Receptacle Control

1.5 COMMISSIONING TEAM

The Commissioning team will include, but is not limited to the following team members.

Ensure all Design and Construction Activities for systems to be commissioned are coordinated with the appropriate commissioning team members.

a. Lead Commissioning Specialist (CxC)

b. QC Manager

c. Sub-Contractor Representatives for each trade responsible for construction/installation of systems to be commissioned

d. Contractor's Project Manager

e. Technical Commissioning Specialists for each system to be commissioned

f. TAB Representative

g. Equipment manufacturer representatives

h. Government Contracting Officer

i. Government Representatives

j. Installation Maintenance Representative

k. Facility End User

1.6 PROJECT SCHEDULE

Include the following tasks in the project schedule required by Section 01 32 01.00 10 PROJECT SCHEDULE. Ensure sufficient time is scheduled to complete each item. The order of items listed below is not intended to imply a specified sequence:

a. Submission and approval of the Commissioning Firm Qualifications
b. Submission and approval of the Interim and Final Construction Phase Commissioning Plans

c. Commissioning Kickoff Meeting

d. Regular Commissioning Coordination Meetings

e. Installation of permanent utilities (gas, water, electric)

f. Building Enclosure Construction

g. Submission and approval of the Completed Building Enclosure Inspection Checklists

h. Manufacturer's Equipment Start-Up for each of the systems to be commissioned

i. Submission and approval of the Completed Commissioning Observation Checklists

j. Submission and approval of Certificate of Readiness for each system to be commissioned

k. Commissioning Testing, including Functional Performance Testing, for each system to be commissioned

1. Integrated Systems Tests

m. Post-test deficiency correction for each system to be commissioned

n. Re-Testing

o. Submission and approval of the Maintenance and Service Life Plans

p. Submission and approval of the Systems Manual

q. Training for each of the systems to be commissioned

r. Submission and approval of the Final Commissioning Reports

1.7 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-06 Test Reports

Completed Construction Observation Checklists; G

Interim Construction Phase Commissioning Plan; G

Final Construction Phase Commissioning Plan; G;

Issues Log; G

SD-07 Certificates

Commissioning Firm; G

Certificate of Readiness; G

SD-10 Operation and Maintenance Data

Maintenance and Service Life Plan; G

Systems Manual; G

SD-11 Closeout Submittals

Final Commissioning Report; G

1.8 COMMISSIONING FIRM

Employ the services of a Commissioning Firm and all Commissioning Specialists required to perform work for this project. The Commissioning Firm must be a first-tier subcontractor that is financially and corporately independent from prime contractor and all other subcontractors and the Designer of Record and that is not participating in any other work on this Contract, including design, furnishing equipment, construction, or testing, adjusting, and balancing.

a. Submit the Commissioning Firm's and Commissioning Specialists' qualifications, including the name of the firm and each CxC and each certification, no later than 30 calendar days after notice to proceed.

b. If, for any reason, a specialist loses a certification during this period, immediately notify the Contracting Officer and submit another Commissioning Specialist for approval. An approved successor must validate all work performed for this project by the CxC who lost a certification.

1.8.1 Commissioning Specialists (CxC)

Assign Lead Commissioning Specialist and other appropriate Commissioning Specialists for the systems to be commissioned.

1.8.1.1 Lead Commissioning Specialist (CxC)

Lead Commissioning Specialist (CxC) coordinates all aspects of the commissioning process. Duties include leading and overseeing the commissioning work and acting as the primary point of contact for the commissioning work. CxC may serve as a systems Specialist if all requirements for both designations are met. CxC must have a minimum of five years of commissioning experience, including two projects of similar size and complexity to this project.

CxC must be certified in one of the following:

NEBB Building System Commissioning Professional (CxCP)

ACG Certified Commissioning Authority (CxA)

ICB/TABB Certified Commissioning Supervisor

BCA Certified Commissioning Professional (CCP)

AEE Certified Building Commissioning Professional (CBCP)

University of Wisconsin-Madison Qualified Commissioning Process Provider (QCxP)

ASHRAE Building Commissioning Professional (BCxP).

1.8.1.2 Commissioning Specialists

Refer to the related technical commissioning specification section for additional qualifications for each Commissioning Specialist associated with each system. Include all Commissioning Specialist qualifications with the Commissioning Firm submittal:

a. Mechanical Commissioning Specialist: The technical work associated with mechanical systems to be commissioned must be performed by a Commissioning Specialist certified by NEBB, ACG, ICB/TABB, AEE, University of Wisconsin-Madison, ASHRAE, or BCA in the commissioning of HVAC systems with five years of experience in the commissioning of HVAC systems.

b. Electrical Commissioning Specialist: The technical work associated with electrical systems to be commissioned must be performed by an engineering technician with five years of experience inspecting, testing, and calibrating electrical distribution and generation equipment, systems, and devices. The lead engineering technician may serve as the Electrical Commissioning Specialist.

c. Building Enclosure Commissioning Specialist: The technical work associated with the Building Envelope system must be performed by a Building Enclosure Commissioning Specialist that is a registered architect or engineer, or building scientist, with five years of building enclosure design or construction experience or a professional with training and Certification in Building Enclosure Commissioning from a third-party certification organization plus five years of commissioning experience. The commissioning provider must have the necessary training, experience, and FPT equipment.

1.9 COMMISSIONING STANDARD

Comply with ASHRAE 202 and the commissioning standards under which the Commissioning Firm and Specialists qualifications are approved, which may include ACG Commissioning Guideline, NEBB S1110, or ANSI/SMACNA 014. In a conflict, the most stringent requirements apply. In addition, comply with ASHRAE 90.1 - IP commissioning requirements for all systems. Refer to related technical commissioning specification sections for additional standards requirements. The following requirements apply to all project commissioning and test standards:

a. Implement all recommendations and suggested practices contained in the Commissioning Standard and test standards.

b. Use the Commissioning Standard for all aspects of Commissioning, including calibration of instruments.

c. Where the instrument manufacturer calibration recommendations are more stringent than those listed in the Commissioning Standard, adhere to the manufacturer calibration recommendations.

d. All quality assurance provisions of the Commissioning Standard such as performance guarantees are part of this contract.

e. The Commissioning Specialists must develop commissioning procedures for any systems or system components not covered in the Commissioning Standard.

f. Use any new requirements, recommendations, and procedures published or adopted by the body responsible for the applicable Commissioning Standards at the time of project award.

g. If there is a conflict between the requirements of the contract documents and the commissioning standard used, the contract documents take precedent.

1.10 ISSUES LOG

The Commissioning Specialist develops and maintains an Issues Log for the systems to be commissioned. The issues log documents and tracks resolution of deficiencies identified during submittal reviews, inspection, and testing. At any point during construction, any commissioning team member finding deficiencies may communicate those deficiencies in writing to the Commissioning Specialist for inclusion into the Issues Log. For each issue, the Issues Log includes, but is not limited to, a unique reference number, description of the issue with contract requirement referenced, location of or equipment name/tags exhibiting the issue, the initials of the individual's name whom reported the issue, the date of first

observation, the proposed resolution of the issue and date proposed, the date of any subsequent observations with applicable additional information, and the date of implementation of the final resolution of the issue as confirmed by the Commissioning Specialist and Contracting Officer. Issues must not be deleted from the issues log.

CxC must submit the Issues Log monthly and within three working days from changes to the Issue Log. The CxC is responsible for distributing the Issues Log to the Commissioning Team. QC Manager must track construction deficiencies identified in the Issues Log using a quality management system in accordance with Section 01 45 00.15 10 RESIDENT MANAGEMENT 01 45 00 QUALITY CONTROL.

1.11 CERTIFICATE OF READINESS

Prior to scheduling Commissioning Tests for each system, the Quality Control Manager must issue a Certificate of Readiness for each system, certifying that inspections have been completed, open issues have been resolved, and the system is ready for Commissioning Tests. Refer to each related technical commissioning specification section for additional requirements.

Submit the Certificate of Readiness for each system 30 calendar days prior to Commissioning Tests of that system. Do not schedule Commissioning Tests for a system until the Certificate of Readiness is approved by the Government.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 CONSTRUCTION SUBMITTAL REVIEWS

Coordinate construction submittal document reviews for commissioned systems and assemblies with the CxC. The commissioning submittal review does not replace the designer of record (DOR) or Government submittal review, in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

The CxC must identify construction submittals to be provided by the contractor for the commissioned systems. The CxC must evaluate construction submittals for compliance with the contract documentsprior to submission to the Government concurrent with DOR review. Include a copy of CxC comments with the construction submittals. The DOR must consider the CxC's comments, and the DOR provides direction to the contractor as necessary. Provide a copy of final DOR submittal reviews with comment responses to the CxC. Include a copy of the submittal document review transmittal and response in the Commissioning Report.

3.2 COMMISSIONING KICKOFF MEETING

Conduct a Commissioning Kickoff Meeting, led by the CxC, after approval of the Commissioning Firm and Commissioning Specialists, and no later than 30 days following approval of the Commissioning Firm and Specialists. Discuss the commissioning process including contract requirements, lines of communication, roles and responsibilities, schedules, documentation requirements, inspection and test procedures, and logistics as specified in this section.

The Contractor's Project Manager, Quality Control team, Designer of Record, and the Government must attend this meeting. Invite the User and Base Civil Engineering Representative to attend this meeting.

3.3 REGULAR COMMISSIONING COORDINATION MEETINGS

The Quality Control team, Designer of Record, and the Government must attend this meeting. Sub-Contractor Representatives for each trade responsible for construction/installation of systems to be commissioned must attend this meeting as requested by the CxC. Invite the User and Pine Bluff Arsenal Representative to attend this meeting.

CxC must conduct monthly commissioning coordination meetings when installation of commissioned systems begins. Provide status of commissioned systems, open issues log items, outstanding submittals, and upcoming commissioning activities. Conduct bi-weekly commissioning coordination meetings within 30 days of the scheduled date for commissioning testing.

Participate in monthly commissioning coordination meetings led by the CxC when installation of commissioned systems begins. Provide status of commissioned systems, open issues log items, outstanding submittals, and upcoming commissioning activities. Participate in bi-weekly commissioning coordination meetings within 30 days of the scheduled date for commissioning testing.

3.4 CONSTRUCTION PHASE COMMISSIONING PLANS

The Interim Construction Phase Commissioning Plan identifies the commissioning and testing standards and outline the overall commissioning process, the commissioning schedule, the commissioning team members and responsibilities, lines of communication, documentation requirements for the construction phase of the project, and Template Building Enclosure Inspection Checklists. Submit the Interim Construction Phase Commissioning Plan, prepared by the CxC, 14 calendar days after the Construction Commissioning Coordination Meeting and 14 days prior to the start of construction of the building enclosure. Include the following items in the commissioning schedule in addition to the items in paragraph PROJECT SCHEDULE: Commissioning Site Visits, Warranty Phase Site Visit, and Updated Commissioning Report.

The Final Construction Phase Commissioning Plan includes the information provided in the Interim Construction Phase Commissioning Plan as well as commissioning construction observation checklists and test procedures such as Pre-Functional Checklists, Integrated Systems Test Checklists, and Functional Performance Test Checklists and other Commissioning Test Checklists for each building, for each system required to be commissioned, and for each component for inclusion in the Final Construction Phase Commissioning Plan. Refer to the related technical commissioning specification section for additional requirements for checklists. Submit the Final Construction Phase Commissioning Plan, prepared by the CxC, no later than 90 calendar days prior to the start of Commissioning Inspections.

3.4.1 Construction Observation Checklists

Construction Observation Checklists must include items for physical inspection or testing that demonstrate that installation and start-up of equipment and systems is complete. Refer to paragraph COMMISSIONING

INSPECTIONS. Construction observation checklists must be tailored to verify the specific installation requirements and details of the construction documents and manufacturer's instructions.

3.4.2 Test Procedures and Checklists

Test procedures and checklists must include procedures that explain, step-by-step, the actions and expected results that will demonstrate that the systems perform in accordance with the contract. Refer to paragraph COMMISSIONING TESTS. Include the following sections and details appropriate to the systems being tested in the test procedures and checklists:

a. Notable system features including information about controls to facilitate understanding of system operation

b. Conclusions and recommendations. Conclusions must clearly indicate if system does or does not perform in accordance with contract requirements. Recommendation must clearly indicate that the system should or should not be approved by the Government.

c. Test conditions including date, beginning and ending time, and beginning and ending outdoor air conditions

d. Attendees

e. Identification of the equipment involved in the test

f. Control system feature identification

g. As-found condition of the system operation

h. List of test items with step numbers along with the corresponding feature or operation, intended test procedure, expected system response, and pass/fail indication.

i. Space for comments for each test item.

3.5 COMMISSIONING SITE VISITS

The CxC must visit the construction site no less than once every 90 days during construction of the commissioned systems to verify that construction is achieving the requirements of the contract documents The CxC must vist the construction site more frequently, as needed, to complete commissioning inspections. Document deficiencies or issues in the Issues Log.

3.6 COMMISSIONING INSPECTIONS

Complete inspections using Construction Observation Checklists for each individual item of equipment or system for each system required to be commissioned in accordance with the commissioning plan. Indicate commissioning team member inspection and validation of each checklist item by initials. Validation of each checklist item by each team member indicates that item conforms to the contract documents and design in their area of responsibility. Commissioning Specialist validation of each checklist item indicates that each item has been installed correctly and in accordance with contract documents. Submit the initialed and Completed Construction Observation Checklists no later than 7 calendar days after completion of inspection of all checklists items for each system.

3.7 COMMISSIONING TESTS

Demonstrate that all systems, equipment, and components have been installed correctly and that the systems operate and perform, including interactive operation between systems, in accordance with contract documents. Perform tests as specified in related technical commissioning specifications. Provide all materials, services, and labor required to perform all commissioning tests.

Commissioning Specialist's duties include leading and documenting all tests for the systems to be commissioned with appropriate sub-contractors performing the Tests. The representatives listed in the paragraph COMMISSIONING TEAM must attend the tests with the exception of the Contractor's Project Manager.

3.7.1 Test Scheduling and Coordination

Schedule Commissioning Tests for each system only after the Certificate of Readiness has been approved by the Government for the system. Correct all deficiencies identified through any prior review, inspection, or test activity before the start of Commissioning tests.

Commissioning Tests and Integrated Systems Tests must be performed with the CxC present. Government reserves the right to witness all tests. Coordinate test schedule with Government representatives.

3.7.2 Testing Procedures

Commissioning tests include tests such as functional performance and integrated systems tests. For electrical systems testing, include testing of sensor calibrations, control responses, safeties, interlocks, operating modes, capacity, lighting levels, and verification of all other electrical system contract performance requirements. Perform test procedures in accordance with the commissioning standards specified. In addition, comply with the testing procedures specified in the sections listed in paragraph RELATED SECTIONS.

3.7.3 Sample Strategy

Refer to the sections identified in paragraph RELATED SECTIONS for sample strategy. Perform commissioning tests for all systems and equipment to be commissioned using the sample strategy identified herein. Complete a Test Checklist for each item of equipment or system to be tested. For sample sizes less than 100 percent for similar equipment, the Contracting Officer's Representative reserves the right to select the specific equipment or system to be tested.

For electrical systems, test 100 percent of all equipment and systems.

Test all central plant equipment, primary air handling units, and cooling or heating equipment. Test all system-level equipment serving multiple zones. Fifty percent sample testing is allowed for large groups of identical equipment with identical controllers serving single zones such as air terminal units, fan coil units, unitary equipment, and plumbing fixtures. Sample size may be no less than three units.

3.7.3.1 100 Percent Sample Procedures

Systems or equipment for which 100 percent sample size are tested fail if one or more of the test procedures results in discovery of a deficiency and the deficiency cannot be resolved within 5 minutes during the test.

Re-test to the extent necessary to confirm that the deficiencies have been corrected without negatively impacting the performance of the rest of the system.

3.7.3.2 Less than 100 Percent Sample Procedures

Randomly test each sample group of identical equipment. Sample size must be at least three units. If 10 percent of the units in the first sample fail the commissioning tests, test a second sample group, the same size as the first sample group. The second sample must not include any units from the first sample group.

If 10 percent of the units in the second sample fail, test all remaining units. If at any point frequent failures occur, the CxC may stop the testing and require the contractor to perform and document a checkout of the remaining equipment prior to continuing commissioning testing.

3.7.4 Aborted Tests and Re-Testing

Abort any test if any deficiency prevents successful completion of the test or if any required commissioning team member is not present for the test. Re-test after all deficiencies identified during the original test have been corrected. Contracting Officer may withhold payment equivalent to lost time, re-testing, and aborted tests. These costs may include salary, travel costs, and per diem for Government team members.

3.8 TRAINING PLAN

CxC must review the training plan for training associated with the equipment and systems to be commissioned, checking that each plan has the trainer name, trainer contract information, training schedule and location. Submit review at least 30 days prior to the first training event. Incorporate CxC review comments prior to submitting training plan in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA. Update and resubmit the training plan based on any corrective action taken.

3.9 SYSTEMS MANUAL

Prepare and submit a Systems Manual, including a signed certification or letter from the Commissioning Specialists and the CxC stating that the Systems Manual is complete, clear, and accurate. The Systems Manual, for all commissioned systems, must conform to Appendix A SYSTEMS MANUAL ORGANIZATION AND CONTENT per ER 25-345-1, available at the USACE Publications website at the following location: https://www.publications.usace.army.mil/USACE-Publications/Engineer-Regulations/. Obtain the Basis of Design for incorporation into the Systems Manual from the Contracting Officer. Submit Systems Manual no later than 30 calendar days following completion of Functional Performance Tests and Integrated Systems Tests. Update and resubmit the Systems Manual based on any corrective action taken during the warranty period.

Ensure Systems Manual is coordinated with the requirements of Section 01 78 23 OPERATION AND MAINTENANCE DATA and Quality Control requirements.

3.10 MAINTENANCE AND SERVICE LIFE PLAN

3.10.1 Maintenance Plan

Prepare and submit a Maintenance Plan for the project mechanical, electrical, plumbing, and fire protection systems. Prepare the HVAC and refrigeration sections of the Maintenance Plan in accordance with ASHRAE 180. Develop required inspection and maintenance tasks similar to Section 5 of ASHRAE 180 for the other commissioned systems and fire protection systems. Ensure Maintenance Plan is coordinated with the requirements of Section 01 78 23 OPERATION AND MAINTENANCE DATA.

Submit the Maintenance Plan no later than 30 calendar days following the completion of Functional Performance Tests and Integrated Systems Tests.

3.10.2 Service Life Plan

Prepare and submit a Service Life Plan for the building enclosure, structural systems, and site hardscape that includes the following for each assembly or component:

a. A description of each including the materials or products.

b. The estimated service life, in years.

c. The estimated maintenance frequency and description of maintenance tasks.

d. The point of maintenance access for the components with estimated service life less than service life of the building.

Ensure Service Life Plan is coordinated with the requirements of Section 01 78 23 OPERATION AND MAINTENANCE DATA. Submit the Service Life Plan no later than 30 calendar days following the completion of Functional Performance Tests and Integrated Systems Tests.

3.11 COMMISSIONING REPORT

Submit an Final Commissioning Report no later than 14 calendar days following commissioning team validation of all Commissioning Tests, including Functional Performance Tests, and Integrated Systems Tests, with the exception of Seasonal Tests. Include the following information in the Final Commissioning Report:

a. An executive summary describing the overall commissioning process, the results of the commissioning process, outstanding deficiencies and recommended resolutions, and seasonal testing that must be scheduled for a later date. Indicate, in the executive summary, whether the systems meet the requirements of the contract documents.

b. A list of deficiencies discovered during the commissioning process and the corrective actions taken in the report.

c. Completed Building Enclosure Inspection Checklists, Pre-Functional Checklists and other Commissioning Observation Checklists, Commissioning Test Checklists such as Functional Performance Test Checklists and Integrated Systems Test Checklists,, the Air Leakage Test Reports and Diagnostic Test Reports, the Final Construction Phase

Commissioning Plan, the Issues Log, Training Attendance Rosters, the Design Review Reports, Submittal Review Report, and any other documents as specified by related technical commissioning specification sections.

3.12 WARRANTY PHASE SITE VISIT

The Lead Commissioning Specialist must visit the building site concurrent with the 9 month warranty inspection to inspect building system equipment and review building operation with the building operating/maintenance staff, and identify any deficiency of the building systems to operate in accordance with the contract documents and the Owner's Project Requirements Document. The Commissioning Specialist must notify the Contracting Officer of any identified deficiencies and the proposed corrective action. Submit Final Commissioning Report and Systems Manuals, documenting the results of the warranty phase inspection. Include other warranty or post-construction phase activities as specified in related technical commissioning specification sections, such as Seasonal testing results.

-- End of Section --

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DIVISION 02

EXISTING CONDITIONS

SECTION 02 41 00

DEMOLITION AND DECONSTRUCTION
08/22

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 145	(1991; R 2025) Standard Specification for Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes
AASHTO T 180	(2025) Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)

ASSP A10.6	(2006) Safety & Health Program Requirements for Demolition Operations - American National Standard for Construction and Demolition Operations

CARPET AND RUG INSTITUTE (CRI)

CRI 104	(2015) Carpet Installation Standard for Commercial Carpet
CRI 105	(2015) Carpet Installation Standard for Residential Carpet

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2024) Safety -- Safety and Occupational Health (SOH) Requirements

U.S. DEFENSE LOGISTICS AGENCY (DLA)

DLA 4145.25	(Jun 2000; Reaffirmed Oct 2010) Storage and Handling of Liquefied and Gaseous Compressed Gases and Their Full and Empty Cylinders; https://www.dla.mil/Portals/104/Documents/DispositionSer/ddsr/docs/cylinderjointpub.pdf

U.S. DEPARTMENT OF DEFENSE (DOD)

DOD 4000.25-1-M	(2006) MILSTRIP - Military Standard Requisitioning and Issue Procedures

MIL-STD-129	(2014; Rev R; Change 1 2018; Change 2 2019; Change 3 2023) Military Marking for Shipment and Storage

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 61	National Emission Standards for Hazardous Air Pollutants
49 CFR 173.301	Shipment of Compressed Gases in Cylinders and Spherical Pressure Vessels

1.2 PROJECT DESCRIPTION

1.2.1 Definitions

1.2.1.1 Critical Root Zone (CRZ)

The critical root zone is the area around and under a tree where the majority of its roots are located. The CRZ is usually measured as a circle with a radius that's 1.5- foot for every inch of the tree's diameter at breast height (DBH), and a depth of 24 inches.

1.2.1.2 Demolition

Demolition is the process of tearing apart and removing any feature of a facility together with any related handling and disposal operations.

1.2.1.3 Deconstruction

Deconstruction is the process of taking apart a facility with the primary goal of preserving the value of all useful building materials.

1.2.1.4 Demolition Plan

Demolition Plan is the planned steps and processes for managing demolition activities and identifying the required sequencing activities and disposal mechanisms.

1.2.1.5 Deconstruction Plan

Deconstruction Plan is the planned steps and processes for dismantling all or portions of a structure or assembly, to include managing sequencing activities, storage, re-installation activities, salvage and disposal mechanisms.

1.2.2 Demolition/Deconstruction Plan

Prepare a Demolition Planand a Deconstruction Plan and submit proposed salvage,demolition,deconstruction,and removal procedures for approval before work is started. Include in the plan procedures for careful removal and disposition of materials specified to be salvaged, coordination with other work in progress, a disconnection schedule of utility services, a detailed description of methods and equipment to be used for each operation and of the sequence of operations. Coordinate with Waste Management Plan in accordance with Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND

DISPOSAL.Include statements affirming Contractor inspection of the existing roof deck and its suitability to perform as a safe working platform or if inspection reveals a safety hazard to workers, state provisions for securing the safety of the workers throughout the performance of the work. Provide procedures for safe conduct of the work in accordance with EM 385-1-1. Plan must be approved by Structural PE and the Contracting Officer prior to work beginning.

1.2.3 General Requirements

Do not begin demolition or deconstruction until authorization is received from the Contracting Officer. Remove rubbish and debris from the project site; do not allow accumulations inside or outside the building. The work includes demolition, salvage of identified items and materials, and removal of resulting rubbish and debris. Remove rubbish and debris from Government property daily, unless otherwise directed. Store materials that cannot be removed daily in areas specified by the Contracting Officer. In the interest of occupational safety and health, perform the work in accordance with EM 385-1-1, Section 17, Demolition, and other applicable Sections.

1.3 ITEMS TO REMAIN IN PLACE

Comply with RFO 52.236-9 to protect existing vegetation, structures, equipment, utilities, and improvements. Coordinate the work of this section with all other work indicated. Construct and maintain shoring, bracing, and supports as required. Ensure that structural elements are not overloaded. Increase structural supports or add new supports as may be required as a result of any cutting, removal, deconstruction, or demolition work performed under this contract. Do not overload structural elements or pavements to remain. Provide new supports and reinforcement for existing construction weakened by demolition, deconstruction, or removal work. Repairs, reinforcement, or structural replacement require approval by the Contracting Officer prior to performing such work.

1.3.1 Existing Construction Limits and Protection

Do not disturb existing construction beyond the extent indicated or necessary for installation of new construction. Provide temporary shoring and bracing for support of building components to prevent settlement or other movement. Provide protective measures to control accumulation and migration of dust and dirt in all work areas. Remove snow, dust, dirt, and debris from work areas daily.

1.3.2 Weather Protection

For portions of the building to remain, protect building interior and materials and equipment from the weather at all times. Where removal of existing roofing is necessary to accomplish work, have materials and workmen ready to provide adequate and temporary covering of exposed areas.

1.3.3 Trees

Protect the trees that are to remain and might be damaged during demolition or deconstruction by a6 foot high fence. Erect and secure fence to protect the critical root zone (CRZ) using a 1.5-foot protection radius for each 1 inch of tree diameter measured at breast height (DBH) or edge of tree canopy, whichever is greater. Replace any tree designated to remain that is damaged during the work under this like-kind and approved by the Contracting Officer.

1.3.4 Utility Service

Maintain existing utilities indicated to stay in service and protect against damage during demolition and deconstruction operations. Prior to start of work, utilities serving each area of alteration or removal will be shut off by the Government,utility provider and disconnected and sealed by the Contractor .

1.3.5 Facilities

Protect electrical and mechanical services and utilities. Where removal of existing utilities and pavement is specified or indicated, provide approved barricades, temporary covering of exposed areas, and temporary services or connections for electrical and mechanical utilities. Floors, roofs, walls, columns, pilasters, and other structural components that are designed and constructed to stand without lateral support or shoring, and are determined to be in stable condition, must remain standing without additional bracing, shoring, or lateral support until demolished or deconstructed, unless directed otherwise by the Contracting Officer. Ensure that no elements determined to be unstable are left unsupported and place and secure bracing, shoring, or lateral supports as may be required as a result of any cutting, removal, deconstruction, or demolition work performed under this contract.

1.4 BURNING

The use of burning at the project site for the disposal of refuse and debris will not be permitted

1.5 AVAILABILITY OF WORK AREAS

Areas in which the work is to be accomplished will be available at contract award.

1.6 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Demolition Plan; G,

Deconstruction Plan; G,

Existing Conditions

SD-07 Certificates

Notification; G,

1.7 QUALITY ASSURANCE

Submit timely notification of demolition,deconstruction projects to

Federal, State, regional, and local authorities in accordance with 40 CFR 61, Subpart M. Notify the Regional Office of the United States Environmental Protection Agency (USEPA),State's environmental protection agency, local air pollution control district/agency, and the Contracting Officer in writing 10 working days prior to the commencement of work in accordance with 40 CFR 61, Subpart M. Comply with federal, state, and local hauling and disposal regulations. In addition to the requirements of the "Contract Clauses," conform to the safety requirements contained in ASSP A10.6. Comply with the Environmental Protection Agency requirements specified. Use of explosives will not be permitted.

1.7.1 Dust and Debris Control

Prevent the spread of dust and debris and avoid the creation of a nuisance or hazard in the surrounding area. Do not use water if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution. Vacuum and dust the work area, Sweep pavements as often as necessary to control the spread of debris as needed.

1.8 PROTECTION

1.8.1 Traffic Control Signs

a. Where pedestrian and driver safety is endangered in the area of removal work, use traffic barricades with flashing lights. Anchor barricades in a manner to prevent displacement by wind, jet or prop blast. Notify the Contracting Officer prior to beginning such work.

1.8.2 Protection of Personnel

Before, during and after the demolition and deconstruction work continuously evaluate the condition of the site specific features structure being demolished and deconstructed and take immediate action to protect all personnel working in and around the project site. No area, section, or component of floors, roofs, walls, columns, pilasters, or other structural element will be allowed to be left standing without sufficient bracing, shoring, or lateral support to prevent collapse or failure while workmen remove debris or perform other work in the immediate area.

1.9 RELOCATIONS

Perform the removal and reinstallation of relocated items as indicated with workmen skilled in the trades involved. Repair or replace items to be relocated which are damaged by the Contractor with new undamaged items as approved by the Contracting Officer.

1.10 EXISTING CONDITIONS

Before beginning any demolition or deconstruction work, survey the site and examine the drawings and specifications to determine the extent of the work. Record existing conditions in the presence of the Contracting Officer or the Contracting Officer's Representative showing the condition of structures and other facilities adjacent to areas of alteration or removal. Photographs or electronic images with a minimum resolution of 3072 x 2304 pixels, capable of a print resolution of 300 dpi, will be acceptable as a record of existing conditions. Include in the record the elevation of the top of foundation walls, finish floor elevations, possible conflicting electrical conduits, plumbing lines, alarms systems, the location and extent of existing cracks and other damage and description of

surface conditions that exist prior to starting work. It is the Contractor's responsibility to verify and document all required outages which will be required during the course of work, and to note these outages on the record document. Submit survey results to the Contracting Officer or the Contracting Officer's Representative.

PART 2 PRODUCTS

2.1 FILL MATERIAL

a. Comply with excavating, backfilling, and compacting procedures for soils used as backfill material to fill basements, voids, depressions or excavations resulting from demolition or deconstruction of structures.

b. Provide fill material conforming to the definition of satisfactory soil material as defined in AASHTO M 145, Soil Classification Groups A-1, A-2-4, A-2-5 and A-3. In addition, fill material must be free from roots and other organic matter, trash, debris, frozen materials, and stones larger than 2 inches in any dimension.

c. Proposed fill material must be sampled and tested by an approved soil testing laboratory, as follows:

Soil classification	AASHTO M 145
Moisture-density relations	AASHTO T 180, Method B or D

PART 3 EXECUTION

3.1 EXISTING FACILITIES TO BE REMOVED

Inspect and evaluate existing structures onsite for reuse. Disassemble existing construction scheduled to be removed for reuse. Dismantled and removed materials are to be separated, set aside, and prepared as specified, and stored or delivered to a collection point for reuse, remanufacture, recycling, or other disposal, as specified. Designate materials for reuse onsite whenever possible.

3.1.1 Structures

a. Remove existing structures indicated to be removed to grade. Remove interior walls, other than retaining walls and partitions, to 2 feet below grade or to top of concrete slab on ground. Break up basement slabs to permit drainage. Remove sidewalks, curbs, gutters and street light bases as indicated.

b. Demolish structures in a systematic manner from the top of the structure to the ground. Complete demolition work above each tier or floor before the supporting members on the lower level are disturbed. Demolish concrete and masonry walls in small sections. Remove structural framing members and lower to ground by means of derricks, platforms hoists, or other suitable methods as approved by the Contracting Officer.

c. Locate demolition and deconstruction equipment throughout the structure and remove materials so as to not impose excessive loads to supporting walls, floors, or framing.

d. Building, or the remaining portions thereof, not exceeding 80 feet in height may be demolished by the mechanical method of demolition.

3.1.2 Utilities and Related Equipment

3.1.2.1 General Requirements

Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by the Contracting Officer. Do not interrupt existing utilities serving facilities occupied and used by the Government except when approved in writing and then only after temporary utility services have been approved and provided. Do not begin demolition or deconstruction work until all utility disconnections have been made. Shut off and cap utilities for future use, as indicated.

3.1.2.2 Disconnecting Existing Utilities

Remove existing utilities and terminate in a manner conforming to the nationally recognized code covering the specific utility and approved by the Contracting Officer. When utility lines are encountered but are not indicated on the drawings, notify the Contracting Officer prior to further work in that area. Remove meters and related equipment and deliver to a location in accordance with instructions of the Contracting Officer.

3.1.3 Chain Link Fencing

Remove chain link fencing, gates and other related salvaged items scheduled for removal and transport to designated areas. Remove gates as whole units. Cut chain link fabric to 25 foot lengths and store in rolls off the ground.

3.1.4 Paving and Slabs

Remove concrete and asphaltic concrete paving and slabs including aggregate base as indicated to a depth of 5 inches below new finish grade. Provide neat sawcuts at limits of pavement removal as indicated. Move, grind and store pavement and slabs designated to be recycled and utilized in this project as directed by the Contracting Officer. Remove pavement and slabs not to be used in this project from the installation at Contractor's expense.

3.1.5 Concrete

Saw concrete along straight lines to a depth of a minimum 2 inch. Make each cut in walls perpendicular to the face and in alignment with the cut in the opposite face. Break out the remainder of the concrete provided that the broken area is concealed in the finished work, and the remaining concrete is sound. At locations where the broken face cannot be concealed, grind smooth or saw cut entirely through the concrete. Sawcuts in existing concrete sidewalk roads, concrete pads, and parking areas must be at the nearest existing expansion joint or weakened plane joint and at full depth.

3.1.6 Structural Steel

Dismantle structural steel at field connections and in a manner that will prevent bending or damage. Salvage for recycle structural steel, steel joists, girders, angles, plates, columns and shapes. Do not use flame-cutting torches. Transport steel joists and girders as whole units

and not dismantled. Transport structural steel shapes to a designated recycling facility area as directed by the Contracting Officer, stacked according to size, type of member and length, and stored off the ground, protected from the weather.

3.1.7 Miscellaneous Metal

Salvage shop-fabricated items such as access doors and frames, steel gratings, metal ladders, wire mesh partitions, metal railings, metal windows and similar items as whole units. Salvage light-gage and cold-formed metal framing, such as steel studs, steel trusses, metal gutters, roofing and siding, metal toilet partitions, toilet accessories and similar items. Scrap metal is the Contractor's property. Recycle scrap metal as part of demolition and deconstruction operations. Provide separate containers to collect scrap metal and transport to a scrap metal collection or recycling facility, in accordance with the Waste Management Plan.

3.1.8 Carpet

Remove existing carpet for reclamation in accordance with manufacturer recommendations and as follows. Remove used carpet in large pieces, roll tightly, and pack neatly in a container. Remove adhesive according to recommendations of the Carpet and Rug Institute (CRI) Provide adhesive removal solvents in compliance with CRI 104/CRI 105. Recycle removed carpet cushion.

3.1.9 Acoustic Ceiling Tile

Remove, neatly stack, and recycle acoustic ceiling tiles. Recycling may be available with manufacturer. Otherwise, give priority to a local recycling organization. Recycling is not required if the tiles contain or may have been exposed to asbestos material.

3.1.10 Patching

Where removals leave holes and damaged surfaces exposed in the finished work, patch and repair these holes and damaged surfaces to match adjacent finished surfaces, using on-site materials when available. Where new work is to be applied to existing surfaces, perform removals and patching in a manner to produce surfaces suitable for receiving new work. Make finished surfaces of patched area flush with the adjacent existing surface and match the existing adjacent surface as closely as possible to texture and finish. Provide patching as specified and indicated, and include the following:

a. Concrete and Masonry: Completely **fill** holes and depressions, caused by previous physical damage or left as a result of removals in existing masonry walls to remain, with an approved masonry patching material, applied in accordance with the manufacturer's printed instructions.

b. Where existing partitions have been removed leaving damaged or missing resilient tile flooring, patch to match the existing floor tile.

c. Patch acoustic lay-in ceiling where partitions have been removed. Make the transition between the different ceiling heights by continuing the higher ceiling level over to the first runner on the lower ceiling and closing the vertical opening with a painted sheet metal strip.

3.1.11 Air Conditioning Equipment

Remove air conditioning, refrigeration, and other equipment containing refrigerants without releasing chlorofluorocarbon refrigerants to the atmosphere in accordance with the Clean Air Act Amendment of 1990. Recover all refrigerants prior to removing air conditioning, refrigeration, and other equipment containing refrigerants and dispose of in accordance with the paragraph entitled ''Disposal of Ozone Depleting Substance (ODS)." Turn in salvaged Class I ODS refrigerants as specified in paragraph, "Salvaged Materials and Equipment."

3.1.12 Cylinders and Canisters

Remove all fire suppression system cylinders and canisters and dispose of in accordance with the paragraph entitled "Disposal of Ozone Depleting Substance (ODS).ˮ

3.1.13 Locksets on Swinging Doors

Remove all locksets from all swinging doors indicated to be removed and disposed of. Deliver the locksets and related items to a designated location for receipt by the Contracting Officer after removal.

3.1.14 Mechanical Equipment and Fixtures

Disconnect mechanical hardware at the nearest connection to existing services to remain, unless otherwise noted. Disconnect mechanical equipment and fixtures at fittings. Remove service valves attached to the unit. Salvage each item of equipment and fixtures as a whole unit; listed, indexed, tagged, and stored. Salvage each unit with its normal operating auxiliary equipment. Transport salvaged equipment and fixtures, including motors and machines, to a designated storage area as directed by the Contracting Officer. Do not remove equipment until approved. Do not offer low-efficiency equipment for reuse; provide to recycling service for disassembly and recycling of parts.

3.1.14.1 Preparation for Storage

Remove water, dirt, dust, and foreign matter from units; drain tanks, piping and fixtures; if previously used to store flammable, explosive, or other dangerous liquids, steam clean interiors. Seal openings with caps, plates, or plugs. Secure motors attached by flexible connections to the unit. Change lubricating systems with the proper oil or grease.

3.1.14.2 Piping

Disconnect piping at unions, flanges and valves, and fittings as required to reduce the pipe into straight lengths for practical storage. Store salvaged piping according to size and type. If the piping that remains can become pressurized due to upstream valve failure, attach end caps, blind flanges, or other types of plugs or fittings with a pressure gage and bleed valve to the open end of the pipe to ensure positive leak control. Carefully dismantle piping that previously contained gas, gasoline, oil, or other dangerous fluids, with precautions taken to prevent injury to persons and property. Store piping outdoors until all fumes and residues are removed. Box prefabricated supports, hangers, plates, valves, and specialty items according to size and type. Wrap sprinkler heads individually in plastic bags before boxing. Classify piping not designated for salvage, or not reusable, as scrap metal.

3.1.14.3 Ducts

Classify removed duct work as scrap metal.

3.1.14.4 Fixtures, Motors and Machines

Remove and salvage fixtures, motors and machines associated with plumbing, heating, air conditioning, refrigeration, and other mechanical system installations. Salvage, box and store auxiliary units and accessories with the main motor and machines. Tag salvaged items for identification, storage, and protection from damage. Classify non-porcelain broken, damaged, or otherwise unserviceable units and not caused to be broken, damaged, or otherwise unserviceable as debris to be disposed of by the Contractor. Salvage and crush porcelain plumbing fixtures unsuitable for reuse.

3.1.15 Electrical Equipment and Fixtures

Salvage motors, motor controllers, and operating and control equipment that are attached to the driven equipment. Salvage wiring systems and components. Box loose items and tag for identification. Disconnect primary, secondary, control, communication, and signal circuits at the point of attachment to their distribution system.

3.1.15.1 Fixtures

Remove and salvage electrical fixtures. Salvage unprotected glassware from the fixture and salvage separately. Salvage incandescent, mercury-vapor, and fluorescent lamps and fluorescent ballasts manufactured prior to 1978, boxed and tagged for identification, and protected from breakage.

3.1.15.2 Electrical Devices

Remove and salvage switches, switchgear, transformers, conductors including wire and nonmetallic sheathed and flexible armored cable, regulators, meters, instruments, plates, circuit breakers, panelboards, outlet boxes, and similar items. Box and tag these items for identification according to type and size.

3.1.15.3 Wiring Ducts or Troughs

Remove and salvage wiring ducts or troughs. Dismantle plug-in ducts and wiring troughs into unit lengths. Remove plug-in or disconnecting devices from the busway and store separately.

3.1.15.4 Conduit and Miscellaneous Items

Salvage conduit except where embedded in concrete or masonry. Consider corroded, bent, or damaged conduit as scrap metal. Sort straight and undamaged lengths of conduit according to size and type. Classify supports, knobs, tubes, cleats, and straps as debris to be removed and disposed.

3.2 CONCURRENT EARTH-MOVING OPERATIONS

Do not begin excavation, filling, and other earth-moving operations that are sequential to demolition or deconstruction work in areas occupied by structures to be demolished or deconstructed until all demolition and

deconstruction in the area has been completed and debris removed. Fill holes, open basements and other hazardous openings.

3.3 DISPOSITION OF MATERIAL

3.3.1 Title to Materials

Except for salvaged items specified in related Sections, and for materials or equipment scheduled for salvage, all materials and equipment removed and not reused or salvaged, become the property of the Contractor and must be removed from Government property. Materials approved for storage by the Contracting Officer must be removed before completion of the contract. Title to materials resulting from demolition and deconstruction, and materials and equipment to be removed, is vested in the Contractor upon approval by the Contracting Officer. The Government will not be responsible for the condition or loss of, or damage to, such property after contract award. Showing for sale or selling materials and equipment on site is prohibited.

3.3.2 Reuse of Materials and Equipment

Remove and store materials and equipment on the plans to be reused or relocated to prevent damage, and reinstall as the work progresses. Coordinate the re-use of materials and equipment with the re-use requirements in accordance with Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL. Capture re-use of materials in the diversion calculations for the project.

3.3.3 Salvaged Materials and Equipment

Remove materials and equipment that are indicated in the plans to be removed by the Contractor and that are to remain the property of the Government, and deliver to a storage site , as directed .

a. Salvage items and material to the maximum extent possible.

b. Store all materials salvaged for the Contractor as approved by the Contracting Officer and remove from Government property before completion of the contract. Coordinate the salvaged materials with tracking requirements in accordance with Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL. Capture salvaged materials in the diversion calculations for the project.

c. Remove salvaged items to remain the property of the Government in a manner to prevent damage, and packed or crated to protect the items from damage while in storage or during shipment. Items damaged during removal or storage must be repaired or replaced to match existing items. Properly identify the contents of containers.

d. Remove historical items in a manner to prevent damage. Deliver the following historical items to the Government for disposition: Corner stones, contents of corner stones, and document boxes wherever located on the site.

e. Remove and capture all Class I ODS refrigerants in accordance with the Clean Air Act Amendment of 1990

3.3.4 Transportation Guidance

Ship all ODS containers in accordance with MIL-STD-129, DLA 4145.25 (also referenced one of the following: Army Regulation 700-68, Naval Supply Instruction 4440.128C, Marine Corps Order 10330.2C, and Air Force Regulation 67-12), 49 CFR 173.301, and DOD 4000.25-1-M.

3.3.5 Unsalvageable and Non-Recyclable Material

Dispose of unsalvageable and non-recyclable noncombustible material .

3.4 CLEANUP

Remove debris and rubbish from project site and similar excavations. Remove and transport the debris in a manner that prevents spillage on streets or adjacent areas. Apply local regulations regarding hauling and disposal.

3.5 DISPOSAL OF REMOVED MATERIALS

3.5.1 Regulation of Removed Materials

Dispose of debris, rubbish, scrap, and other nonsalvageable materials resulting from removal operations with all applicable federal, state and local regulations as contractually specified in the Waste Management Plan. Storage of removed materials on the project site is prohibited.

3.5.2 Burning on Government Property

Burning of materials removed from demolished and deconstructed structures will not be permitted on Government property.

3.5.3 Removal to Spoil Areas on Government Property

Transport noncombustible materials removed from demolition and deconstruction structures to designated spoil areas on Government property.

3.5.4 Removal from Government Property

Transport waste materials removed from demolished and deconstructed structures, except waste soil, from Government property for legal disposal. Dispose of waste soil as directed.

3.6 REUSE OF SALVAGED ITEMS

Recondition salvaged materials and equipment designated for reuse before installation. Replace items damaged during removal and salvage operations or restore them as necessary to usable condition.

-- End of Section --

SECTION 02 82 00

ASBESTOS REMEDIATION
08/25

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)

ASSP Z9.2	(2018) Fundamentals Governing the Design and Operation of Local Exhaust Ventilation Systems

ASTM INTERNATIONAL (ASTM)

ASTM D522/D522M	(2017; R 2021) Mandrel Bend Test of Attached Organic Coatings
ASTM D2794	(1993; R 2024) Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
ASTM D4397	(2016; R 2023) Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications
ASTM E84	(2025) Standard Test Method for Surface Burning Characteristics of Building Materials
ASTM E96/E96M	(2024a) Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials
ASTM E119	(2024) Standard Test Methods for Fire Tests of Building Construction and Materials
ASTM E736/E736M	(2019) Standard Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members
ASTM E1368	(2023) Standard Practice for Visual Inspection of Asbestos Abatement Projects
ASTM E1494	(2025) Standard Practice for Encapsulants for Spray- or Trowel-Applied Friable Asbestos-Containing Building Materials

COMPRESSED GAS ASSOCIATION (CGA)

CGA G-7	(2019) Standard for Compressed Air for Human Respiration; 6th Edition

INTERNATIONAL SAFETY EQUIPMENT ASSOCIATION (ISEA)

ANSI/ISEA Z87.1	(2025) Occupational and Educational Personal Eye and Face Protection Devices

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 701	(2023; ERTA 1 2023) Standard Methods of Fire Tests for Flame Propagation of Textiles and Films

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

NIOSH NMAM	(2020; 5th Ed) NIOSH Manual of Analytical Methods

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2024) Safety -- Safety and Occupational Health (SOH) Requirements

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 340/1-90-018	(1990) Asbestos/NESHAP Regulated Asbestos Containing Materials Guidance
EPA 560/5-85-024	(1985) Guidance for Controlling Asbestos-Containing Materials in Buildings (Purple Book)

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.147	The Control of Hazardous Energy (Lock Out/Tag Out)
29 CFR 1926.51	Sanitation
29 CFR 1926.59	Hazard Communication
29 CFR 1926.103	Respiratory Protection
29 CFR 1926.200	Accident Prevention Signs and Tags
29 CFR 1926.1101	Asbestos
40 CFR 61-SUBPART A	General Provisions
40 CFR 61-SUBPART M	National Emission Standard for Asbestos
40 CFR 763	Asbestos
42 CFR 84	Approval of Respiratory Protective Devices
49 CFR 107	Hazardous Materials Program Procedures

49 CFR 171	General Information, Regulations, and Definitions
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
49 CFR 173	Shippers - General Requirements for Shipments and Packagings

UL SOLUTIONS (UL)

UL 586	(2009; Reprint Sep 2022) UL Standard for Safety High-Efficiency Particulate, Air Filter Units

1.2 DEFINITIONS

1.2.1 Amended Water

Water containing a wetting agent or surfactant with a maximum surface tension of 0.00042 psi.

1.2.2 Area Sampling

Sampling of asbestos fiber concentrations which approximates the concentrations of asbestos in the theoretical breathing zone but is not actually collected in the breathing zone of an employee.

1.2.3 Asbestos

The term asbestos includes chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite and any of these minerals that have been chemically treated or altered.

1.2.4 Asbestos Containing Material (ACM)

Any material which contains greater than 1 percent asbestos.

1.2.5 Asbestos Containing Construction Material (ACCM)

Any manufactured construction material which contains more than 1/10th of 1 percent asbestos by weight.

1.2.6 Asbestos Control Area

That area where asbestos removal operations are performed which is isolated by physical boundaries which assist in the prevention of the uncontrolled release of asbestos dust, fibers, or debris.

1.2.7 Asbestos Fibers

Those fibers having an aspect ratio of at least 3:1 and longer than 5 micrometers as determined by National Institute for Occupational Safety and Health (NIOSH) Method 7400.

1.2.8 Asbestos Permissible Exposure Limit

0.1 fibers per cubic centimeter of air as an 8-hour time weighted average measured in the breathing zone as defined by 29 CFR 1926.1101 or other Federal legislation having legal jurisdiction for the protection of workers health.

1.2.9 Authorized Person

Any person authorized by the Contractor and required by work duties to be present in the regulated areas.

1.2.10 Background

The ambient airborne asbestos concentration in an uncontaminated area as measured prior to any asbestos hazard abatement efforts. Background concentrations for other (contaminated) areas are measured in similar but asbestos free locations.

1.2.11 Competent Person (CP)

A person meeting the requirements for competent person as specified in 29 CFR 1926.1101 including a person capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, who has the authority to take prompt corrective measures to eliminate them, and is specifically trained in a training course which meet the criteria of EPA's Model Accreditation Plan 40 CFR 763) for project designer or supervisor, or its equivalent. The competent person must have a current State of Arkansas asbestos contractors or supervisors license.

1.2.12 Contractor

The Contractor is that individual, or entity under contract to perform the herein listed work.

1.2.13 Disposal Bag

A 6 mil thick, leak-tight plastic bag, pre-labeled in accordance with 29 CFR 1926.1101, used for transporting asbestos waste from containment to disposal site.

1.2.14 Disturbance

Activities that disrupt the matrix of ACM or ACCM, crumble or pulverize ACM or ACCM, or generate visible debris from ACM ACCM. Disturbance includes cutting away small amounts of ACM or ACCM, no greater than the amount which can be contained in one standard sized glovebag or waste bag, not larger than 60 inches in length and width or as required by state or local regulations in order to access a building component.

1.2.15 Encapsulation

The abatement of an asbestos hazard through the appropriate use of a physical barrier or chemical encapsulants.

1.2.16 Encapsulants

Specific materials in various forms used to chemically or physically entrap asbestos fibers in various configurations to prevent these fibers from becoming airborne. There are four types of encapsulants as follows which must comply with performance requirements as specified herein.

a. Removal Encapsulant (can be used as a wetting agent)

b. Bridging Encapsulant (used to provide a tough, durable surface coating to asbestos containing material)

c. Penetrating Encapsulant (used to penetrate the asbestos containing material encapsulating all asbestos fibers and preventing fiber release due to routine mechanical damage)

d. Lock-Down Encapsulant (used to seal off or "lock-down" minute asbestos fibers left on surfaces from which asbestos containing material has been removed).

1.2.17 Friable Asbestos Material

A term defined in 40 CFR 61-SUBPART Mand EPA 340/1-90-018 meaning any material which contains more than 1 percent asbestos, as determined using the method specified in 40 CFR 763, Polarized Light Microscopy (PLM), that when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.

1.2.18 Glovebag Technique

Those asbestos removal and control techniques put forth in 29 CFR 1926.1101.

1.2.19 HEPA Filter Equipment

High efficiency particulate air (HEPA) filtered vacuum and exhaust ventilation equipment with a filter system capable of collecting and retaining asbestos fibers. Filters must retain 99.97 percent of particles 0.3 microns or larger as indicated in UL 586.

1.2.20 Model Accreditation Plan (MAP)

USEPA training accreditation requirements for persons who work with asbestos as specified in 40 CFR 763.

1.2.21 Negative Pressure Enclosure (NPE)

That engineering control technique described as a negative pressure enclosure in 29 CFR 1926.1101 or applicable state regulations.

1.2.22 NESHAP

National Emission Standards for Hazardous Air Pollutants. The USEPA NESHAP regulation for asbestos is at 40 CFR 61-SUBPART M. Requirements associated with demolition and renovation activities are found in Section 61.145 of the NESHAP while requirements associated with waste disposal are found in Section 61.150.

1.2.23 Nonfriable Asbestos Material

Material that contains asbestos in which the fibers have been immobilized by a bonding agent, coating, binder, or other material so that the asbestos fibers are not normally released during appropriate use, handling, storage or transportation. It is understood that asbestos fibers may be released under other conditions such as demolition, removal, or mishap.

1.2.24 Permissible Exposure Limits (PELs)

1.2.24.1 PEL-Time Weighted Average(TWA)

Concentration of asbestos not in excess of 0.1 fibers per cubic centimeter of air (f/cc) as an 8-hour time weighted average (TWA).

1.2.24.2 PEL-Excursion Limit

An airborne concentration of asbestos not in excess of 1.0 f/cc of air as averaged over a sampling period of 30 minutes.

1.2.25 Personal Sampling

Air sampling which is performed to determine asbestos fiber concentrations within the breathing zone of a specific employee, as performed in accordance with 29 CFR 1926.1101.

1.2.26 Presumed ACM

Any material which cannot be sampled at the time of the initial inspection due to inaccessibility, structural or safety concerns (such as charged electrical components), or could void active warranties (such as roofing materials). Presumed ACM must be managed as ACM unless proven to not be ACM through testing by a qualified and certified asbestos professional.

1.2.27 Private Qualified Person (PQP)

A Registered Architect, Professional Engineer, Certified Industrial Hygienist, consultant or other qualified person who has successfully completed training and is therefore accredited under a legitimate State Model Accreditation Plan as described in 40 CFR 763 as a Building Inspector, Contractor/Supervisor Abatement Worker, and Asbestos Project Designer. The PQP that collects samples and elects to analyze samples on site must successfully complete the National Institute of Occupational Safety and Health (NIOSH) 582 course "Sampling and Evaluating Airborne Asbestos Dust" or equivalent, and must participate in the American Industrial Hygiene Association (AIHA) Asbestos Analysis Registry (AAR). The PQP must be appropriately licensed in the State of Arkansas.

1.2.28 TEM

Refers to Transmission Electron Microscopy.

1.2.29 Thermal System Insulation

Thermal system insulation (TSIACM applied to pipes, fittings, boilers, breeching, tanks, ducts or other structural components to prevent heat loss or gain.

1.2.30 Time Weighted Average (TWA)

The TWA is an 8-hour time weighted average airborne concentration of asbestos fibers.

1.2.31 Transite

A generic name for asbestos cement wallboard and pipe.

1.2.32 Wetting Agent

A chemical added to water to reduce the water's surface tension thereby increasing the water's ability to soak into the material to which it is applied. An equivalent wetting agent must have a surface tension of at most 0.00042 psi.

1.2.33 Worker

Individual (not designated as the Competent Person or a supervisor) who performs asbestos work and has completed asbestos worker training required by 29 CFR 1926.1101, to include EPA Model Accreditation Plan (MAP) "Worker" training; accreditation, if required by the OSHA Class of work to be performed or by the state where the work is performed.

1.3 REQUIREMENTS

1.3.1 Description of Work

The work covered by this section includes the handling and control of asbestos containing materials and describes some of the resultant procedures and equipment required to protect workers, the environment and occupants of the building or area, or both, from contact with airborne asbestos fibers. The work also includes the disposal of any asbestos containing materials generated by the work. More specific operational procedures must be outlined in the Asbestos Hazard Abatement Plan called for elsewhere in this specification. The asbestos work includes the demolition and removal or encapsulation of any found substance which is governed by 40 CFR 763. Under normal conditions non-friable or chemically bound materials containing asbestos would not be considered hazardous; however, this material may release airborne asbestos fibers during demolition and removal and therefore must be handled in accordance with the removal and disposal procedures as specified herein. Provide negative pressure enclosure techniques as outlined in this specification. The building work area must be evacuated during the asbestos abatement work. A competent person must supervise asbestos removal work as specified herein.

1.3.1.1 Wallboard/Joint Compound

Both composite samples of the wallboard and discrete samples of the components (wallboard and joint compound) have been tested and results are attached.

Test as required. No Testing is provided for and will only be required and provided for to verify the presence of asbestos when suspicious areas are encountered..

1.3.2 Unexpected Discovery of Asbestos

Notify the Contracting Officer if any previously untested building

components suspected to contain asbestos are impacted by the work.

1.3.3 Medical Requirements

Provide medical requirements including but not limited to medical surveillance and medical record keeping as listed in 29 CFR 1926.1101.

1.3.3.1 Medical Examinations

Contractor must submit documentation of workers who perform activities potentially impacted ACM or ACCM including the name of each employee, type of exam received, and date of the exam. The documentation must also include a signed statement that the medical examination was reviewed by the contractor's Safety Manager and Industrial Hygienist stating that the listed personnel have received the required medical examination in accordance with 29 CFR 1926.1101 and the exam results are saved. This requirement must have been satisfied within the 12 months prior to the start of work on this contract. The same medical examination must be given on an annual basis to employees engaged in an occupation involving asbestos and within 30 calendar days before or after the termination of employment in such occupation. Specifically identify x-ray films of asbestos workers to the consulting radiologist and mark medical record jackets with the word "ASBESTOS."

1.3.3.2 Medical Records

Maintain complete and accurate records of employees' medical examinations, medical records, and exposure data for a period of indefinite time after termination of employment and make records of the required medical examinations and exposure data available for inspection and copying to: The Assistant Secretary of Labor for Occupational Safety and Health (OSHA), or authorized representatives of them, and an employee's physician upon the request of the employee or former employee.

1.3.4 Employee Training

Submit certificates, prior to the start of work but after the main abatement submittal, signed by each employee indicating that the employee has received training in the proper handling of materials and wastes that contain asbestos in accordance with 40 CFR 763; understands the health implications and risks involved, including the illnesses possible from exposure to airborne asbestos fibers; understands the use and limits of the respiratory equipment to be used; and understands the results of monitoring of airborne quantities of asbestos as related to health and respiratory equipment as indicated in 29 CFR 1926.1101 on an initial and annual basis. Organize certificates by individual worker, not grouped by type of certification. Make training requirement records readily available in accordance with 40 CFR 763. Train personnel involved in the asbestos control work in accordance with United States Environmental Protection Agency (USEPA) Asbestos Hazard Emergency Response Act (AHERA) training criteria or State training criteria whichever is more stringent. Document the training by providing: dates of training, training entity, course outline, names of instructors, and qualifications of instructors upon request by the Contracting Officer. Furnish each employee with respirator training and fit testing administered by the PQP as required by 29 CFR 1926.1101 and 29 CFR 1926.103. Fully cover engineering and other hazard control techniques and procedures. Asbestos workers must have a current State of Arkansas asbestos worker's license.

1.3.5 Permits, Licenses, and Notifications

Prior to the start of work, obtain necessary permits and licenses in conjunction with asbestos removal, encapsulation, hauling, and disposition, and furnish notification of such actions required by Federal, State, regional, and local authorities. Notify the Regional Office of the United States Environmental Protection Agency (USEPA) State's environmental protection agency, local air pollution control district/agency, local/City Asbestos Control Bureau and the Contracting Officer in writing 20 working days prior to commencement of work in accordance with 40 CFR 61-SUBPART M. Notify the Contracting Officer and other appropriate Government agencies in writing 20 working days prior to the start of asbestos work as indicated in applicable laws, ordinances, criteria, rules, and regulations. Submit copies of all Notifications to the Contracting Officer. Notify the local fire department 3 days prior to removing fire-proofing material from the building including notice that the material contains asbestos.

1.3.6 Environment, Safety and Health Compliance

In addition to detailed requirements of this specification, comply with those applicable laws, ordinances, criteria, rules, and regulations of Federal, State, regional, and local authorities regarding handling, storing, transporting, and disposing of asbestos waste materials. Comply with the applicable requirements of the current issue of EM 385-1-1, 29 CFR 1926.1101, 40 CFR 61-SUBPART A, 40 CFR 61-SUBPART Mand 40 CFR 763. Submit matters of interpretation of standards to the appropriate administrative agency for resolution before starting the work. Where the requirements of this specification, applicable laws, rules, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirement as defined by the Government apply. The following laws, ordinances, criteria, rules and regulations regarding removal, handling, storing, transporting and disposing of asbestos materials apply:

a. 15 U.S.C § 2641-2656, TSCA Subchapter II: Asbestos Hazard Emergency Response

b. 15 U.S.C. § 2607(f): The Asbestos Information Act

c. 29 CFR 1910.1001 - Asbestos General Standard; Specification of permissible exposure limits, engineering controls, worker training, labeling, respiratory protection, and disposal of asbestos waste.

d. 29 CFR 1926.1101 - Asbestos Construction Standard; Covers construction work involving asbestos, including work practices during demolition and renovation, worker training, disposal of asbestos waste, and specification of permissible exposure limits

e. 40 CFR 61-SUBPART M (Complete Rule)

f. 40 CFR §61.145 - Standard for Demolition and Renovation

15 U40 CFR Part 302.4 - Hazardous Substances and Reportable Quantities

h. 40 CFR Part 763 Appendix C to Subpart E - Asbestos Model Accreditation Plan

i. 40 CFR Part 763 Appendix D to Subpart E - Transport and Disposal of Asbestos Waste

j. 40 CFR Part 763 Appendix E to Subpart E - Interim Method of the Determination of Asbestos in Bulk Insulation Samples

k. 40 CFR Part 763 Appendix G - Asbestos Worker Protection

1. 42 U.S.C. 7401 et. Seq - the Clean Air Act

m. Projects Requiring Inspection

n. Arkansas Certified Inspector

o. EPA

p. Arkansas Departmnet of Health

q. OSHA

1.3.7 Respiratory Protection Program

Establish and implement a respirator program as required by 29 CFR 1926.1101, and 29 CFR 1926.103 and applicable state and local regulations. Submit a written description of the program to the Contracting Officer. Submit a written program manual or operating procedure including methods of compliance with regulatory statutes.

1.3.7.1 Respirator Program Records

Submit records of the respirator program as required by 29 CFR 1926.103, and 29 CFR 1926.1101.

1.3.7.2 Respirator Fit Testing

The Contractor's PQP must conduct a qualitative or quantitative fit test conforming to 29 CFR 1926.103 for each worker required to wear a respirator, and any authorized visitors who enter a regulated area where respirators are required to be worn. A respirator fit test must be performed prior to initially wearing a respirator and every 12 months thereafter. If physical changes develop that affects the fit, a new fit test must be performed. Functional fit checks must be performed each time a respirator is put on and in accordance with the manufacturer's recommendation.

1.3.7.3 Respirator Selection and Use Requirements

Provide respirators, and ensure that they are used as required by 29 CFR 1926.1101 and in accordance with CGA G-7 and the manufacturer's recommendations. Respirators must be approved by the National Institute for Occupational Safety and Health NIOSH, under the provisions of 42 CFR 84, for use in environments containing airborne asbestos fibers. For air-purifying respirators, the particulate filter must be high-efficiency particulate air (HEPA)/(N-,R-,P-100). The initial respirator selection and the decisions regarding the upgrading or downgrading of respirator type must be made by the Contractor's Designated IH based on the measured or anticipated airborne asbestos fiber concentrations to be encountered.

1.3.8 Asbestos Hazard Control Supervisor

The Contractor must be represented on site by a supervisor, trained using the model Contractor accreditation plan as indicated in the Federal

statutes for all portions of the herein listed work.

1.3.9 Hazard Communication

Adhere to all parts of 29 CFR 1926.59 and provide the Contracting Officer with a copy of the Safety Data Sheets (SDS) for all materials brought to the site.

1.3.10 Asbestos Hazard Abatement Plan

Submit a detailed plan of the safety precautions such as lockout, tagout, tryout, fall protection, and confined space entry procedures and equipment and work procedures to be used in the encapsulation, removal and demolition of materials containing asbestos. The plan, not to be combined with other hazard abatement plans, must be prepared, signed, and sealed by the PQP. Provide a Table of Contents for each abatement submittal, which follows the sequence of requirements in the contract. The plan must include but not be limited to the precise personal protective equipment to be used including, but not limited to, respiratory protection, type of whole-body protection and if reusable coveralls are to be employed, an outer disposable layer such as disposable whole body cover must be employed over the top of the coveralls, the location of asbestos control areas including clean and dirty areas, buffer zones, showers, storage areas, change rooms, removal or encapsulation method, interface of trades involved in the construction, sequencing of asbestos related work, disposal plan, type of wetting agent and asbestos sealer to be used, locations of local exhaust equipment, planned air monitoring strategies, and a detailed description of the method to be employed in order to control environmental pollution. The plan must also include (both fire and medical emergency) response plans and an Activity Hazard Analyses (AHAs) in accordance with EM 385-1-1. The Asbestos Hazard Abatement Plan must be approved in writing prior to starting any asbestos work. The Contractor, Asbestos Hazard Control Supervisor, CP and PQP must meet with the Contracting Officer prior to beginning work, to discuss in detail the Asbestos Hazard Abatement Plan, including work procedures and safety precautions. Once approved by the Contracting Officer, the plan will be enforced as if an addition to the specification. Any changes required in the specification as a result of the plan must be identified specifically in the plan to allow for free discussion and approval by the Contracting Officer prior to starting work.

1.3.11 Testing Laboratory

Submit the name, address, telephone number, and appliable laboratory certification(s) of each testing laboratory selected for the sampling, analysis, and reporting of airborne concentrations of asbestos fibers along with evidence that each laboratory selected holds the appropriate State license and permits and certification that each laboratory is American Industrial Hygiene Association (AIHA) accredited and that persons counting the samples have been judged proficient by current inclusion on the AIHA Asbestos Analysis Registry (AAR) and successful participation of the laboratory in the Proficiency Analytical Testing (PAT) Program. Where analysis to determine asbestos content in bulk materials or transmission electron microscopy is required, submit evidence that the laboratory is accredited by the National Institute of Science and Technology (NIST) under National Voluntary Laboratory Accreditation Program (NVLAP) for asbestos analysis. The testing laboratory firm must be independent of the asbestos contractor and must have no employee or employer relationship which could constitute a conflict of interest.

1.3.12 Landfill Approval

Submit written evidence that the landfill is approved for asbestos disposal by the U.S. Environmental Protection Agency, Region 3, Air Enforcement Section (38WI2) and local regulatory authority. Within three working days after delivery, submit detailed delivery tickets, prepared, signed, and dated by an agent of the landfill, certifying the amount of asbestos materials delivered to the landfill. Submit a copy of the waste shipment records within one day of the shipment leaving the project site.

1.3.13 Transporter Certification

Submit written evidence that the transporter is approved to transport asbestos waste in accordance with the DOT requirements of 49 CFR 171, 49 CFR 172, 49 CFR 173, as well as registration requirements of 49 CFR 107 and all other State and local regulatory agency requirements.

1.3.14 Medical Certification

Provide a written certification for each worker and supervisor, signed by a licensed physician indicating that the worker and supervisor has met or exceeded all of the medical prerequisites listed herein and in 29 CFR 1926.1101 and 29 CFR 1926.103 as prescribed by law. Submit certificates prior to the start of work but after the main abatement submittal.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" or "[11]8[11]" classification. Submittals not having a "G" or "[11]8[11]" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Amended Water; G

Safety Data Sheets (SDS) for All Materials; G

Encapsulants; G

Respirators; G

Local Exhaust Equipment; G

Pressure Differential Automatic Recording Instrument; G

Vacuums; G

Glovebags; G

SD-06 Test Reports

Air Sampling Results; G

Pressure Differential Recordings for Local Exhaust System; G

Encapsulation Test Patches; G

Clearance Sampling; G

Asbestos Disposal Quantity Report; G

SD-07 Certificates

Employee Training; G

Notifications; G

Respiratory Protection Program; G

Asbestos Hazard Abatement Plan; G

Testing Laboratory; G

Landfill Approval; G

Delivery Tickets; G

Waste Shipment Records; G

Transporter Certification; G

Medical Certification; G

Private Qualified Person Documentation; G

Designated Competent Person; G

Worker's License; G

Contractor's License; G

Federal, State or Local Citations on Previous Projects; G

Encapsulants; G

Equipment Used to Contain Airborne Asbestos Fibers; G

Water Filtration Equipment; G

Vacuums; G

Ventilation Systems; G

SD-11 Closeout Submittals

Permits and Licenses; G

Notifications; G

Respirator Program Records; G

Rental Equipment; G

1.5 QUALITY ASSURANCE

1.5.1 Private Qualified Person Documentation

Submit the name, address, and telephone number of the PQP selected to prepare the Asbestos Hazard Abatement Plan, direct monitoring and training, and documented evidence that the PQP has successfully completed training in and is accredited and where required is certified as, a Building Inspector, Contractor/Supervisor Abatement Worker, and Asbestos Project Designer as described by 40 CFR 763 and has successfully completed the National Institute of Occupational Safety and Health (NIOSH) 582 course "Sampling and Evaluating Airborne Asbestos Dust" or equivalent. The PQP must be appropriately licensed in the State of Arkansas as a Project Monitor. The PQP and the asbestos contractor must not have an employee/employer relationship or financial relationship which could constitute a conflict of interest. The PQP must be a first tier subcontractor.

1.5.2 Designated Competent Person Documentation

The Designated Competent Person must be experienced in the administration and supervision of asbestos abatement projects including exposure assessment and monitoring, work practices, abatement methods, protective measures for personnel, setting up and inspecting asbestos abatement work areas, evaluating the integrity of containment barriers, placement and operation of local exhaust systems, ACM generated waste containment and disposal procedures, decontamination units installation and maintenance requirements, site safety and health requirements, notification of other employees onsite. The Designated Competent Person must be on-site at all times when asbestos abatement activities are underway.Submit training certification and a current State of Arkansas Asbestos Contractor's and Supervisor's License. Submit evidence that the Designated Competent Person has a minimum of 2 years of on-the-job asbestos abatement experience relevant to OSHA designated competent person requirements. The Designated Competent Person must be a first tier subcontractor.

1.5.3 Worker's License

Submit documentation that workers meet the requirements of 29 CFR 1926.1101, 40 CFR 61-SUBPART Mand have a current State of Arkansas Asbestos Workers License.

1.5.4 Contractor's License

Submit a copy of the asbestos contractor's license issued by the State of Arkansas. Submit the following certification along with the license: "I certify that the personnel I am responsible for during the course of this project fully understand the contents of 29 CFR 1926.1101, 40 CFR 61-SUBPART MEM 385-1-1, and the Federal, State and local requirements for those asbestos abatement activities that they will be involved in." This certification statement must be signed by the Company's President or Chief Executive.

1.5.5 Air Sampling Results

Complete fiber counting and provide results to the PQP for review within 16 hours of the "time off" of the sample pump. Notify the Contracting Officer immediately of any airborne levels of asbestos fibers in excess of the acceptable limits. Submit sampling results to the Contracting Officer and the affected Contractor employees where required by law within three working days, signed by the testing laboratory employee performing air

sampling, the employee that analyzed the sample, and the PQP. Notify the Contractor and the Contracting Officer immediately of any variance in the pressure differential which could cause adjacent unsealed areas to have asbestos fiber concentrations in excess of 0.01 fibers per cubic centimeter or background whichever is higher. In no circumstance must levels exceed 0.1 fibers per cubic centimeter.

1.5.6 Pressure Differential Recordings for Local Exhaust System

Provide a local exhaust system that creates a negative pressure of at least 0.02 inches of water relative to the pressure external to the enclosure and operate it continuously, 24-hours a day, until the temporary enclosure of the asbestos control area is removed. Submit pressure differential recordings for each work day to the PQP for review and to the Contracting Officer within 24-hours from the end of each work day.

1.5.7 Federal, State or Local Citations on Previous Projects

Submit a statement, signed by an officer of the company, containing a record of any citations issued by Federal, State or local regulatory agencies relating to asbestos activities within the last 5 years (including projects, dates, and resolutions); a list of penalties incurred through non-compliance with asbestos project specifications, including liquidated damages, overruns in scheduled time limitations and resolutions; and situations in which an asbestos-related contract has been terminated (including projects, dates, and reasons for terminations). If there are none, a negative declaration signed by an officer of the company must be provided.

1.5.8 Preconstruction Conference

Conduct a safety preconstruction conference to discuss the details of the Asbestos Hazard Abatement Plan, Accident Prevention Plan (APP) including the AHAs required in specification Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS . The safety preconstruction conference must include the Contractor and their Designated Competent Person, Designated IH and Project Supervisor and the Contracting Officer. Deficiencies in the APP must be discussed. Onsite work must not begin until the APP has been accepted.

1.6 SECURITY

Security must be provided for each regulated area. A log book must be kept documenting entry into and out of the regulated area. Entry into regulated areas must only be by personnel authorized by the Contractor and the Contracting Officer. Personnel authorized to enter regulated areas must be trained, medically evaluated, and wear the required personal protective equipment.

1.7 EQUIPMENT

1.7.1 Rental Equipment

Provide a copy of the written notification to the rental company concerning the intended use of the equipment and the possibility of asbestos contamination of the equipment.

PART 2 PRODUCTS

2.1 ENCAPSULANTS

Encapsulants must conform to current USEPA requirements, contain no toxic or hazardous substances as defined in 29 CFR 1926.59, and conform to the following performance requirements.

2.1.1 Removal Encapsulants

Requirement	Test Standard
Flame Spread - 25, Smoke Emission - 50	ASTM E84
Life Expectancy - 20 years	Warranted by the manufacturer to perform for at least 20 years as a durable barrier in the environment and conditions similar to the planned application
Permeability - Minimum 0.4 perms	ASTM E96/E96M
Fire Resistance - Negligible affect on fire resistance rating over 3 hour test (Classified by UL for use over fibrous and cementitious sprayed fireproofing)	ASTM E119
Impact Resistance - Minimum 43 in/lb	ASTM D2794 Gardner Impact Test
Flexibility - no rupture or cracking	ASTM D522/D522M Mandrel Bend Test

2.1.2 Bridging Encapsulant

Requirement	Test Standard
Flame Spread - 25, Smoke Emission - 50	ASTM E84
Life Expectancy - 20 years	Warranted by the manufacturer to perform for at least 20 years as a durable barrier in the environment and conditions similar to the planned application
Permeability - Minimum 0.4 perms	ASTM E96/E96M
Fire Resistance - Negligible affect on fire resistance rating over 3-hour test (Classified by UL for use over fibrous and cementitious sprayed fireproofing)	ASTM E119

Requirement	Test Standard
Impact Resistance - Minimum 43 in/lb	ASTM D2794 Gardner Impact Test
Flexibility - no rupture or cracking	ASTM D522/D522M Mandrel Bend Test

2.1.3 Penetrating Encapsulant

Requirement	Test Standard
Flame Spread - 25, Smoke Emission - 50	ASTM E84
Life Expectancy - 20 years	Warranted by the manufacturer to perform for at least 20 years as a durable barrier in the environment and conditions similar to the planned application
Permeability - Minimum 0.4 perms	ASTM E96/E96M
Cohesion/Adhesion Test - 50 pounds of force/foot	ASTM E119
Fire Resistance - Negligible affect on fire resistance rating over 3-hour test (Classified by UL for use over fibrous and cementitious sprayed fireproofing)	ASTM E119
Impact Resistance - Minimum 43 in/lb	ASTM D2794 Gardner Impact Test
Flexibility - no rupture or cracking	ASTM D522/D522M Mandrel Bend Test

2.1.4 Lock-down Encapsulant

Requirement	Test Standard
Flame Spread - 25, Smoke Emission - 50	ASTM E84

Requirement	Test Standard
Life Expectancy - 20 years	Warranted by the manufacturer to perform for at least 20 years as a durable barrier in the environment and conditions similar to the planned application
Permeability - Minimum 0.4 perms	ASTM E96/E96M
Fire Resistance - Negligible affect on fire resistance rating over 3-hour test (Tested with fireproofing over encapsulant applied directly to steel member)	ASTM E119
Bond Strength: 100 pounds of force/foot	ASTM E736/E736M
(Tests compatibility with cementitious and fibrous fireproofing)	

2.2 ENCASEMENT PRODUCTS

Encasement must consist of primary cellular polymer coat, polymer finish coat, and any other finish coat as approved by the Contracting Officer.

2.3 DUCT TAPE

Industrial grade duct tape of appropriate widths suitable for bonding sheet plastic and disposal container.

2.4 DISPOSAL CONTAINERS

Leak-tight (defined as solids, liquids, or dust that cannot escape or spill out) disposal containers must be provided for ACM wastes as required by 29 CFR 1926.1101 and state and local regulatory requirements. Disposal containers can be in the form of:

a. Disposal Bags

b. Fiberboard Drums

c. Cardboard Boxes

2.5 SHEET PLASTIC

Sheet plastic must be polyethylene of 6 mil minimum thickness and must be provided in the largest sheet size necessary to minimize seams. Film must be clear frosted or black and conform to ASTM D4397, except as specified below

2.5.1 Flame Resistant

Where a potential for fire exists, flame-resistant sheets must be provided. Film must be frosted or black and must conform to the

requirements of NFPA 701.

2.5.2 Reinforced

Reinforced sheets must be provided where high skin strength is required, such as where it constitutes the only barrier between the regulated area and the outdoor environment. The sheet stock must consist of translucent, nylon-reinforced or woven-polyethylene thread laminated between two layers of polyethylene film. Film must meet flame resistant standards of NFPA 701.

2.6 MASTIC REMOVING SOLVENT

Mastic removing solvent must be nonflammable and must not contain methylene chloride, glycol ether, or halogenated hydrocarbons. Solvents used onsite must have a flash point greater than 140 degrees F.

Prior to approving the use of mastic removing solvent for renovation projects where a new material is placed on the treated surface, the treated surface with mastic removing solvent must be completely removed. Remaining mastic removing solvent may react with glues and mastic of the new product.

2.7 LEAK-TIGHT WRAPPING

Two layers of 6 mil minimum thick polyethylene sheet stock must be used for the containment of removed asbestos-containing components or materials such as large tanks, boilers, insulated pipe segments and other materials. Upon placement of the ACM component or material, each layer must be individually leak-tight sealed with duct tape.

2.8 VIEWING INSPECTION WINDOW

Where feasible, a minimum of one clear, 1/8 inch thick, acrylic sheet, 18 by 24 inches, must be installed as a viewing inspection window at eye level on a wall in each containment enclosure. The windows must be sealed leak-tight with industrial grade duct tape.

2.9 WETTING AGENTS

Removal encapsulant (a penetrating encapsulant) must be provided when conducting removal abatement activities that require a longer removal time or are subject to rapid evaporation of amended water. The removal encapsulant must be capable of wetting the ACM and retarding fiber release during disturbance of the ACM greater than or equal to that provided by amended water. Performance requirements for penetrating encapsulants are specified in paragraph ENCAPSULANTS above.

PART 3 EXECUTION

3.1 EQUIPMENT

Provide the Contracting Officer or the Contracting Officer's Representative, with at least two complete sets of personal protective equipment including reusable coveralls with an outer disposable full body cover as required for entry to and inspection of the asbestos control area. Provide equivalent training to the Contracting Officer or a designated representative as provided to Contractor employees in the use of the required personal protective equipment. Provide manufacturer's certificate of compliance for all equipment used to contain airborne asbestos fibers.

3.1.1 Air Monitoring Equipment

The Contractor's PQP must approve air monitoring equipment. The equipment must include, but must not be limited to:

a. High-volume sampling pumps that can be calibrated and operated at a constant airflow up to 16 liters per minute.

b. Low-volume, battery powered, body-attachable, portable personal pumps that can be calibrated to a constant airflow up to approximately 3.5 liters per minute, and a self-contained rechargeable power pack capable of sustaining the calibrated flow rate for a minimum of 10 hours. The pumps must also be equipped with an automatic flow control unit which must maintain a constant flow, even as filter resistance increases due to accumulation of fiber and debris on the filter surface.

c. Single use standard 25 mm diameter cassette, open face, 0.8 micron pore size, mixed cellulose ester membrane filters and cassettes with 50 mm electrically conductive extension cowl, and shrink bands for personal air sampling.

d. Single use standard 25 mm diameter cassette, open face, 0.45 micron pore size, mixed cellulose ester membrane filters and cassettes with 50 mm electrically conductive cowl, and shrink bands when conducting environmental area sampling using NIOSH NMAM Methods 7400 and 7402, (and the transmission electric microscopy method specified at 40 CFR 763 if required).

e. A flow calibrator capable of calibration to within plus or minus 2 percent of reading over a temperature range of minus 4 to plus 140 degrees F and traceable to a NIST primary standard.

3.1.2 Respirators

Select respirators from those approved by the National Institute for Occupational Safety and Health (NIOSH), Department of Health and Human Services.

3.1.2.1 Respirators for Handling Asbestos

Provide personnel engaged in pre-cleaning, cleanup, handling, encapsulation removal and/or demolition of asbestos materials with respiratory protection as indicated in 29 CFR 1926.1101 and 29 CFR 1926.103. Breathing air must comply with CGA G-7.

3.1.3 Exterior Whole Body Protection

3.1.3.1 Outer Protective Clothing

Provide personnel exposed to asbestos with disposable "non-breathable," whole body outer protective clothing, head coverings, gloves, and foot coverings. Provide disposable plastic or rubber gloves to protect hands. Cloth gloves may be worn inside the plastic or rubber gloves for comfort, but must not be used alone. Make sleeves secure at the wrists, make foot coverings secure at the ankles, and make clothing secure at the neck by the use of tape.

3.1.3.2 Work Clothing

Provide cloth work clothes for wear under the outer protective clothing and foot coverings and either dispose of or properly decontaminate them as recommended by the PQP after each use.

3.1.3.3 Personal Decontamination Unit

Provide a temporary, negative pressure unit with a separate decontamination locker room and clean locker room with a shower that complies with 29 CFR 1926.51(f)(4)(ii) through (V) in between for personnel required to wear whole body protective clothing. Provide two separate lockers for each asbestos worker, one in each locker room. Keep street clothing and street shoes in the clean locker. HEPA vacuum and remove asbestos contaminated disposable protective clothing while still wearing respirators at the boundary of the asbestos work area and seal in impermeable bags or containers for disposal. Do not wear work clothing between home and work. Locate showers between the decontamination locker room and the clean locker room and require that all employees shower before changing into street clothes. Collect used shower water and filter with approved water filtration equipment to remove asbestos contamination. Wastewater filters must be installed in series with the first stage pore size 20 microns and the second stage pore size of 5 microns. Dispose of filters and residue as asbestos waste. Discharge clean water to the sanitary system. Dispose of asbestos contaminated work clothing as asbestos contaminated waste. Keep the floor of the decontamination unit's clean room dry and clean at all times. Proper housekeeping and hygiene requirements must be maintained. Provide soap and towels for showering, washing and drying. Cloth towels provided must be disposed of as ACM waste. Physically attach the decontamination units to the asbestos control area. Construct both a personnel decontamination unit and an equipment decontamination unit onto and integral with each asbestos control area.

3.1.3.4 Eye Protection

Provide eye protection that complies with ANSI/ISEA Z87.1 when operations present a potential eye injury hazard. Provide goggles to personnel engaged in asbestos abatement operations when the use of a full face respirator is not required.

3.1.4 Regulated Areas

All Class I, II, and III asbestos work must be conducted within regulated areas. The regulated area must be demarcated to minimize the number of persons within the area and to protect persons outside the area from exposure to airborne asbestos. Control access to regulated areas, ensure that only authorized personnel enter, and verify that Contractor required medical surveillance, training and respiratory protection program requirements are met prior to allowing entrance.

3.1.5 Load-out Unit

Provide a temporary load-out unit that is adjacent and connected to the regulated area and access tunnel. Attach the load-out unit in a leak-tight manner to each regulated area.

3.1.6 Warning Signs and Labels

Provide bilingual warning signs printed in English and Spanish at all

approaches to asbestos control areas. Locate signs at such a distance that personnel may read the sign and take the necessary protective steps required before entering the area. Provide labels and affix to all asbestos materials, scrap, waste, debris, and other products contaminated with asbestos. Containers with preprinted warning labels conforming to the requirements are acceptable

3.1.6.1 Warning Sign

Provide vertical format conforming to applicable state and local regulations and 29 CFR 1926.200, and 29 CFR 1926.1101 minimum 20 by 14 inches displaying the following legend in the lower panel:

Legend	Notation
DANGER	one inch Sans Serif Gothic or Block
ASBESTOS	one inch Sans Serif Gothic or Block
MAY CAUSE CANCER	one inch Sans Serif Gothic or Block
CAUSES DAMAGE TO LUNGS	1/4 inch Sans Serif Gothic or Block
AUTHORIZED PERSONNEL ONLY	1/4 inch Sans Serif Gothic or Block
WEAR RESPIRATORY PROTECTION AND PROTECTIVE CLOTHING IN THIS AREA	1/4 inch Sans Serif Gothic or Block

Spacing between lines must be at least equal to the height of the upper of any two lines.

3.1.6.2 Warning Labels

Provide labels conforming to local and state regulations and 29 CFR 1926.1101 of sufficient size to be clearly legible, displaying the following legend:

DANGER
CONTAINS ASBESTOS FIBERS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
DO NOT BREATHE DUST AVOID CREATING DUST

3.1.7 Local Exhaust System

Provide a local exhaust system in the asbestos control area in accordance with ASSP Z9.2 and 29 CFR 1926.1101 that provides at least four air changes per hour inside of the negative pressure enclosure. Local exhaust equipment must be operated 24-hours per day, until the asbestos control area is removed and must be leak proof to the filter and equipped with HEPA filters. Maintain a minimum pressure differential in the control area of minus 0.02 inch of water column relative to adjacent, unsealed areas. Provide continuous 24-hour per day monitoring of the pressure differential with a pressure differential automatic recording instrument. The building ventilation system must not be used as the local exhaust system for the asbestos control area. Filters on exhaust equipment must conform to ASSP Z9.2 and UL 586. Terminate the local exhaust system out of doors and remote from any public access or ventilation system intakes.

3.1.8 Tools

Vacuums must be leak proof to the filter and equipped with HEPA filters. Filters on vacuums must conform to ASSP Z9.2 and UL 586. Do not use power tools to remove asbestos containing materials unless the tool is equipped with effective, integral HEPA filtered exhaust ventilation systems. Remove all residual asbestos from reusable tools prior to storage or reuse. Reusable tools must be thoroughly decontaminated prior to being removed from the regulated areas.

3.1.9 Rental Equipment

If rental equipment is to be used, furnish written notification to the rental agency concerning the intended use of the equipment and the possibility of asbestos contamination of the equipment.

3.1.10 Glovebags

Submit written manufacturers proof that glovebags do not break down under expected temperatures and conditions.

3.1.11 Single Stage Decontamination Area

A decontamination area (equipment room/area) must be provided for Class I work involving less than 25 feet or 10 square feet of TSI or surfacing ACM, and for Class II and Class III asbestos work operations where exposures exceed the PELs or where there is no negative exposure assessment. The equipment room or area must be adjacent to the regulated area for the decontamination of employees, material, and their equipment which could be contaminated with asbestos. The area must be covered by an impermeable drop cloth on the floor or horizontal working surface. The area must be of sufficient size to accommodate cleaning of equipment and removing personal protective equipment without spreading contamination beyond the area.

3.1.12 Decontamination Area Exit Procedures

Ensure that the following procedures are followed:

a. Before leaving the regulated area, remove all gross contamination and debris from work clothing using a HEPA vacuum.

b. Employees must remove their protective clothing in the equipment room and deposit the clothing in labeled impermeable bags or containers for

disposal.

c. Employees must not remove their respirators until showering.

d. Employees must shower prior to entering the clean room. If a shower has not been located between the equipment room and the clean room or the work is performed outdoors, ensure that employees engaged in Class I asbestos jobs: a) Remove asbestos contamination from their work suits in the equipment room or decontamination area using a HEPA vacuum before proceeding to a shower that is not adjacent to the work area; or b) Remove their contaminated work suits in the equipment room, without cleaning worksuits, and proceed to a shower that is not adjacent to the work area.

3.2 WORK PROCEDURE

Perform asbestos related work in accordance with 29 CFR 1926.1101, 40 CFR 61-SUBPART M, and as specified herein. Use wet or if given prior EPA approval, dry removal procedures appropriate encapsulation procedures as listed in the asbestos hazard abatement plan and negative pressure enclosure techniques. Wear and utilize protective clothing and equipment as specified herein. No eating, smoking, drinking, chewing gum, tobacco, or applying cosmetics is permitted in the asbestos work or control areas. Personnel of other trades not engaged in the encapsulation, removal and demolition of asbestos containing material must not be exposed at any time to airborne concentrations of asbestos unless all the personnel protection and training provisions of this specification are complied with by the trade personnel. Seal all roof top penetrations, except plumbing vents, prior to asbestos roofing work. Shut down the building heating, ventilating, and air conditioning system, cap the openings to the system, and provide temporary heating, and ventilation, and air conditioning prior to the commencement of asbestos work. Power to the regulated area must be locked-out and tagged in accordance with 29 CFR 1910.147. Disconnect electrical service when encapsulation or wet removal is performed and provide temporary electrical service with verifiable ground fault circuit interrupter (GFCI) protection prior to the use of any water or encapsulant. All electrical work must be performed by a licensed electrician. Stop abatement work in the regulated area immediately when the airborne total fiber concentration: (1) equals or exceeds 0.01 f/cc, or the pre-abatement concentration, whichever is greater, outside the regulated area; or (2) equals or exceeds 1.0 f/cc inside the regulated area. Correct the condition to the satisfaction of the Contracting Officer, including visual inspection and air sampling. Work must resume only upon notification by the Contracting Officer. Corrective actions must be documented. If an asbestos fiber release or spill occurs outside of the asbestos control area, stop work immediately, correct the condition to the satisfaction of the Contracting Officer including clearance sampling, prior to resumption of work.

3.2.1 Building Ventilation System and Critical Barriers

Building ventilation system supply and return air ducts in a regulated area must be shut down and isolated by lockable switch or other positive means in accordance with 29 CFR 1910.147. isolated by airtight seals to prevent the spread of contamination throughout the system. The airtight seals must consist of air-tight rigid covers for building ventilation supply and exhaust grills where the ventilation system is required to remain in service during abatement using two layers of polyethylene. Edges to wall, ceiling and floor surfaces must be sealed with industrial grade duct tape.

a. A Competent Person must supervise the work.

b. For indoor work, critical barriers must be placed over all openings to the regulated area.

c. Impermeable dropcloths must be placed on surfaces beneath all removal activity.

3.2.2 Protection of Existing Work to Remain

Perform work without damage or contamination of adjacent work. Where such work is damaged or contaminated as verified by the Contracting Officer using visual inspection or sample analysis, it must be restored to its original condition or decontaminated by the Contractor as deemed appropriate by the Contracting Officer. This includes inadvertent spill of dirt, dust, or debris in which it is reasonable to conclude that asbestos may exist. When these spills occur, stop work immediately. Then clean up the spill. When satisfactory visual inspection and air sampling results are obtained from the PQP work may proceed at the discretion of the Contracting Officer.

3.2.3 Furnishings

Furniture, and mobile equipment will be removed from the area of work by the Government before asbestos work begins.

Furniture mounted equipment will remain in the building. Cover and seal furnishings with 6-mil plastic sheet or remove from the work area and store in a location on site approved by the Contracting Officer.

3.2.4 Precleaning

Wet wipe and HEPA vacuum all surfaces potentially contaminated with asbestos prior to establishment of an enclosure.

3.2.5 Asbestos Control Area Requirements

3.2.5.1 Negative Pressure Enclosure

Removal of asbestos contaminated acoustical ceiling tiles, spray applied fireproofing, thermal system insulation, gypsum wallboard/joint compound require the use of a negative pressure enclosure. Block and seal openings in areas where the release of airborne asbestos fibers can be expected. Establish an asbestos negative pressure enclosure with the use of curtains, portable partitions, or other enclosures in order to prevent the escape of asbestos fibers from the contaminated asbestos work area. Negative pressure enclosure development must include protective covering of uncontaminated walls, and ceilings with a continuous membrane of two layers of minimum 6-mil plastic sheet sealed with tape to prevent water or other damage. Provide two layers of 6-mil plastic sheet over floors and extend a minimum of 12 inches up walls. Seal all joints with tape. Provide local exhaust system in the asbestos control area. Openings are allowed in enclosures of asbestos control areas for personnel and equipment entry and exit, the supply and exhaust of air for the local exhaust system and the removal of properly containerized asbestos containing materials. Replace local exhaust system filters as required to maintain the efficiency of the system.

3.2.5.2 Glovebag

If the construction of a negative pressure enclosure is infeasible for the removal encapsulation of field verified items. Use alternate techniques as indicated in 29 CFR 1926.1101. Establish designated limits for the asbestos regulated area with the use of rope or other continuous barriers, and maintain all other requirements for asbestos control areas. The PQP must conduct personal samples of each worker engaged in asbestos handling (removal, disposal, transport and other associated work) throughout the duration of the project. If the quantity of airborne asbestos fibers monitored at the breathing zone of the workers at any time exceeds background or 0.01 fibers per cubic centimeter whichever is greater, stop work, evacuate personnel in adjacent areas or provide personnel with approved protective equipment at the discretion of the Contracting Officer. This sampling may be duplicated by the Government at the discretion of the Contracting Officer. If the air sampling results obtained by the Government differ from those obtained by the Contractor, the Government will determine which results predominate. If adjacent areas are contaminated as determined by the Contracting Officer, clean the contaminated areas, monitor, and visually inspect the area as specified herein.

3.2.5.3 Regulated Area for Class II Removal

Removal of asbestos containing floor tile/mastic, carpet/mastic, sealants, are Class II removal activities. Establish designated limits for the asbestos regulated work area with the use of red barrier tape; install critical barriers, splash guards and signs, and maintain all other requirements for asbestos control area except local exhaust. Place impermeable dropcloths on surfaces beneath removal activity extending out 3 feet in all directions. A detached decontamination system may be used. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

3.2.6 Removal Procedures

Wet asbestos material with a fine spray of amended water a specific wetting agent such as light oil during removal, cutting, or other handling so as to reduce the emission of airborne fibers. Remove material and immediately place in 6 mil plastic disposal bags. Remove asbestos containing material in a gradual manner, with continuous application of the amended water or wetting agent in such a manner that no asbestos material is disturbed prior to being adequately wetted. Where unusual circumstances prohibit the use of 6 mil plastic bags, submit an alternate proposal for containment of asbestos fibers to the Contracting Officer for approval. For example, in the case where both piping and insulation are to be removed, the Contractor may elect to wet the insulation, wrap the pipes and insulation in plastic and remove the pipe by sections. Containerize asbestos containing material while wet. Do not allow asbestos material to accumulate or become dry. Lower and otherwise handle asbestos containing material as indicated in 40 CFR 61-SUBPART M.

3.2.6.1 Sealing Contaminated Items Designated for Disposal

Remove contaminated architectural, mechanical, and electrical appurtenances

such as venetian blinds, full-height partitions, carpeting, duct work, pipes and fittings, radiators, light fixtures, conduit, panels, and other contaminated items designated for removal by completely coating the items with an asbestos lock-down encapsulant at the demolition site before removing the items from the asbestos control area. These items need not be vacuumed. The asbestos lock-down encapsulant must be tinted a contrasting color and spray-applied by airless method. Thoroughness of sealing operation must be visually gauged by the extent of colored coating on exposed surfaces. Lock-down encapsulants must comply with the performance requirements specified herein.

3.2.6.2 Exposed Pipe Insulation Edges

Contain edges of asbestos insulation to remain that are exposed by a removal operation. Wet and cut the rough ends true and square with sharp tools and then encapsulate the edges with a 1/4 inch thick layer of non-asbestos containing insulating cement troweled to a smooth hard finish. When cement is dry, lag the end with a layer of non-asbestos lagging cloth, overlapping the existing ends by at least 4 inches. When insulating cement and cloth is an impractical method of sealing a raw edge of asbestos, take appropriate steps to seal the raw edges as approved by the Contracting Officer.

3.2.6.3 Presumed ACM

Presumed ACM must be treated as ACM throughout the abatement and disposal process. Testing can be performed by a trained and certified asbestos professional following applicable local, state, and federal regulations to either confirm the material is ACM or non-ACM. If testing proves asbestos is not present, the material can be managed as non-ACM.

3.2.7 Methods of Compliance

3.2.7.1 Mandated Practices

The specific abatement techniques and items identified must be detailed in the Contractor's Asbestos Hazard Abatement Plan (AHAP). Use the following engineering controls and work practices in all operations, regardless of the levels of exposure:

a. Vacuum cleaners equipped with HEPA filters.

b. Wet methods or wetting agents except where it can be demonstrated that the use of wet methods is unfeasible due to the creation of electrical hazards, equipment malfunction, and in roofing.

c. Prompt clean-up and disposal.

d. Inspection and repair of polyethylene.

e. Cleaning of equipment and surfaces of containers prior to removing them from the equipment room or area.

3.2.7.2 Control Methods

Use the following control methods:

a. Local exhaust ventilation equipped with HEPA filter;

b. Enclosure or isolation of processes producing asbestos dust;

c. Where the feasible engineering and work practice controls are not sufficient to reduce employee exposure to or below the PELs, use them to reduce employee exposure to the lowest levels attainable and must supplement them by the use of respiratory protection.

3.2.7.3 Unacceptable Practices

The following work practices must not be used:

a. High-speed abrasive disc saws that are not equipped with point of cut ventilator or enclosures with HEPA filtered exhaust air.

b. Compressed air used to remove asbestos containing materials, unless the compressed air is used in conjunction with an enclosed ventilation system designed to capture the dust cloud created by the compressed air.

c. Dry sweeping, shoveling, or other dry clean up.

d. Employee rotation as a means of reducing employee exposure to asbestos.

3.2.8 Class I Work Procedures

In addition to requirements of paragraphs MANDATED PRACTICES and CONTROL METHODS, the following engineering controls and work practices must be used:

a. A Competent Person must supervise the installation and operation of the control methods.

b. For jobs involving the removal of more than 25 feet or 10 square feet of TSI or surfacing material, place critical barriers over all openings to the regulated area.

c. HVAC systems must be isolated in the regulated area by sealing with a double layer of plastic or air-tight rigid covers.

d. Impermeable dropcloths (6 mil or greater thickness) must be placed on surfaces beneath all removal activity.

e. Where a negative exposure assessment has not been provided or where exposure monitoring shows the PEL was exceeded, the regulated area must be ventilated with a HEPA unit and employees must use PPE.

3.2.9 Specific Control Methods for Class I Work

Use Class I work procedures, control methods and removal methods for the following ACM:

a. Spray Applied Fireproofing

b. Gypsum Wallboard and Joint Compound

c. Thermal System Insulation and Mudded Pipe Fittings

d. Plaster and Textured Ceilings and Walls

e. Vermiculite insulation

3.2.9.1 Negative Pressure Enclosure (NPE) System

The system must provide at least four air changes per hour inside the containment. The local exhaust unit equipment must be operated 24-hours per day until the containment is removed. The NPE must be smoke tested for leaks at the beginning of each shift and be sufficient to maintain a minimum pressure differential of minus 0.02 inch of water column relative to adjacent, unsealed areas. Pressure differential must be monitored continuously, 24-hours per day, with an automatic manometric recording instrument and records must be provided daily on the same day collected to the Contracting Officer. The Contracting Officer must be notified immediately if the pressure differential falls below the prescribed minimum. The building ventilation system must not be used as the local exhaust system for the regulated area. The NPE must terminate outdoors unless an alternate arrangement is allowed by the Contracting Officer. All filters used must be new at the beginning of the project and must be periodically changed as necessary and disposed of as ACM waste.

3.2.9.2 Glovebag Systems

Glovebags must be used without modification, smoke-tested for leaks, and completely cover the circumference of pipe or other structures where the work is to be done. Glovebags must be used only once and must not be moved. Glovebags must not be used on surfaces that have temperatures exceeding 150 degrees F. Prior to disposal, glovebags must be collapsed using a HEPA vacuum. Before beginning the operation, loose and friable material adjacent to the glovebag operation must be wrapped and sealed in two layers of plastic or otherwise rendered intact. At least two persons must perform glovebag removal. Asbestos regulated work areas must be established for glovebag abatement. Designated boundary limits for the asbestos work must be established with rope or other continuous barriers and all other requirements for asbestos control areas must be maintained, including area signage and boundary warning tape.

a. Attach HEPA vacuum systems to the bag to prevent collapse during removal of ACM.

b. The negative pressure glove boxes must be fitted with gloved apertures and a bagging outlet and constructed with rigid sides from metal or other material which can withstand the weight of the ACM and water used during removal. A negative pressure must be created in the system using a HEPA filtration system. The box must be smoke tested for leaks prior to each use.

3.2.9.3 Mini-Enclosure

Single bulkhead containment, Double bulkhead containment or Mini-containment (small walk-in enclosure) to accommodate no more than two persons, may be used if the disturbance or removal can be completely contained by the enclosure. The mini-enclosure must be inspected for leaks and smoke tested before each use. Air movement must be directed away from the employee's breathing zone within the mini-enclosure.

3.2.9.4 Wrap and Cut Operation

Prior to cutting pipe, the asbestos-containing insulation must be wrapped with polyethylene and securely sealed with duct tape to prevent asbestos becoming airborne as a result of the cutting process. The following steps must be taken: install glovebag, strip back sections to be cut 6 inches

from point of cut, and cut pipe into manageable sections.

3.2.9.5 Class I Removal Method

Class I ACM must be removed using a control method described above. Prepare work area as previously specified. Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers, signs, and maintain all other requirements for asbestos control area. Spread one layer of 6-mil seamless plastic sheeting on the floor below the work area. Remove asbestos containing spray applied fireproofing using a scraper and wet methods and immediately place into 6-mil thickness disposal bag. After removal of the material use a wire brush to clean the exposed substrate to remove residual material. Continue wet cleaning until surfaces are free of visible debris. Cut manageable sections of gypsum wallboard and joint compound and immediately place into a 6-mil minimum thickness disposal bag or other approved container. Make every effort to keep the material from falling to the floor of the work area. Use a wire brush and wet clean to remove residual material from studs. Continue wet cleaning until the surface is clean of visible material and encapsulate stud walls. Remove ACM thermal system insulation and mudded pipe fittings using mechanical means and wet methods and immediately place into 6-mil thickness disposal bag. Continue wet cleaning until surfaces are free of visible debris. Remove ACM plaster ceilings or walls using mechanical means and adequately wet methods and immediately place into 6-mil thickness disposal bag. Make every effort to keep the material from falling to the floor of the work area. Continue wet cleaning until surfaces are free of visible debris. Remove ACM textured ceiling finish using a scraper and wet methods and immediately place into 6-mil thickness disposal bag. Floors are considered contaminated from fallen textured ceiling finish. Clean up debris on floor and dispose of carpet as asbestos contaminated material. After removal of the material use a wire brush to clean the exposed concrete ceiling to remove residual material. Continue wet cleaning until surfaces are free of visible debris. Remove ACM vermiculite using mechanical means and adequately wet methods and immediately place into 6-mil thickness disposal bag. Make every effort to keep the material from falling to the floor of the work area. Continue wet cleaning until surfaces are free of visible debris. Bag all asbestos debris which has fallen to the floor as asbestos-containing debris. Place all debris in plastic disposal bags of 6-mil minimum thickness. Once the material is in the disposal bag, apply additional water as needed to achieve "adequately wet" conditions for NESHAP compliance. Place bagged asbestos waste under negative pressure with the use of a HEPA vacuum, goose neck and duct tape to seal the bag, wash to remove any visible contamination and place into a second 6-mil minimum thickness disposal bag. Containerize asbestos containing waste while wet. Lower and otherwise handle asbestos containing materials as indicated in 40 CFR 61-SUBPART M. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the quantity of airborne asbestos fibers monitored at the breathing zone of the workers or the designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work, and immediately correct the situation.

3.2.10 Class II Work Procedures

In addition to the requirements of paragraphs MANDATED PRACTICES and CONTROL METHODS, the following engineering controls and work practices must be used:

a. A Competent Person must supervise the work.

b. For indoor work, critical barriers must be placed over all openings to the regulated area.

c. Impermeable dropcloths must be placed on surfaces beneath all removal activity.

3.2.11 Specific Control Methods for Class II Work

3.2.11.1 Vinyl and Asphaltic Flooring Materials, Carpet and Mastic

Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers, signs, and maintain all other requirements for asbestos control area except local exhaust. A detached decontamination system may be used. When removing vinyl floor tile and mastic, carpet and mastic which contains ACM, use the following practices. Remove floor tile and mastic, carpet and mastic using adequately wet methods. Remove floor tiles, carpet and mastic intact (if possible). Wetting is not required when floor tiles are heated and removed intact. Do not sand flooring or its backing. Scrape residual adhesive and backing using wet methods. Mechanical chipping is prohibited unless performed in a negative pressure enclosure. Dry sweeping is prohibited. Use vacuums equipped with HEPA filter, disposable dust bag, and metal floor tool (no brush) to clean floors. Place debris into a 6-mil minimum thickness disposal bag or other approved container. Once the material is in the disposal bag, apply additional water as needed to achieve "adequately wet'' conditions for NESHAP compliance. Place bagged asbestos waste under negative pressure with the use of a HEPA vacuum, goose neck and duct tape to seal the bag, wash to remove any visible contamination and place into a second 6-mil minimum thickness disposal bag. Containerize asbestos containing waste while wet. Lower and otherwise handle asbestos containing materials as indicated in 40 CFR 61-SUBPART M. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

3.2.11.2 Sealants and Mastic

Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers and signs, and maintain all other requirements for asbestos control area except local exhaust. Spread 6-mil plastic sheeting on the ground around the perimeter of the work area extending out in all directions. Using adequately wet methods, carefully remove the ACM sealants and mastics using a scraper of knife blade. As it is removed place the material into a disposal bag. Make every effort to keep the asbestos material from falling to the ground or work area floor below. Dry sweeping is prohibited. Use vacuums equipped with HEPA filter and disposable dust bag. Place debris into a 6-mil minimum thickness disposal bag or other approved container. Once the material is in the disposal bag, apply additional water as needed to achieve "adequately wet'' conditions for NESHAP compliance. Place bagged asbestos waste under negative pressure with the use of a HEPA vacuum, goose neck and duct tape to seal the bag, wash to remove any visible contamination and place into a second 6-mil minimum thickness disposal bag. Containerize asbestos containing waste while wet. Lower and otherwise handle asbestos containing materials as indicated in 40 CFR 61-SUBPART M. Conduct area monitoring of

airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the airborne fiber concentration of the workers or at designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

3.2.11.3 Suspect Fire Doors

Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers, signs, and maintain all other requirements for asbestos control area except local exhaust. A detached decontamination system may be used. Spread 6-mil plastic sheeting on the ground beneath the work area and around the perimeter of the work area extending out in all directions. Remove door intact from hinges and wrap with 6-mil plastic sheeting. Inspect the interior areas of the door to determine if ACM is present. If ACM is not present the door may be disposed of as general construction debris. If ACM is present place whole door in enclosed container for disposal. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

3.2.11.4 Roofing Materials

Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers, signs, and maintain all other requirements for asbestos control area except local exhaust. When removing roofing materials which contain ACM as described in 29 CFR 1926.1101 (g)(8)(ii), use the following practices. Roofing material must be removed in an intact state. Wet methods must be used to remove roofing materials that are not intact, or to be rendered not intact during removal, unless such wet methods are not feasible or create safety hazards. When removing built-up roofs, with asbestos-containing roofing felts and an aggregate surface, using a power roof cutter, all dust resulting from the cutting operations must be collected by a HEPA dust collector, or must be HEPA vacuumed by vacuuming along the cut line. Asbestos-containing roofing material must not be dropped or thrown to the ground, but must be lowered to the ground via covered, dust-tight chute, crane, hoist or other method approved by the Contracting Officer. Any ACM that is not intact must be lowered to the ground as soon as practicable, but not later than the end of the work shift. While the material remains on the roof it must be kept wet or placed in an impermeable waste bag or wrapped in plastic sheeting. Intact ACM must be lowered to the ground as soon as practicable, but not later than the end of the work shift. Unwrapped material must be transferred to a closed receptacle. Critical barriers must be placed over roof level heating and ventilation air intakes. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

3.2.11.5 Cementitious Siding and Shingles or Transite Panels

Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers, signs, and maintain all other

requirements for asbestos control area except local exhaust. When removing cementitious asbestos-containing siding, shingles or Transite panels use the following work practices. Intentionally cutting, abrading or breaking is prohibited. Each panel or shingle must be sprayed with amended water or wetting agent prior to removal. Nails must be cut with flat, sharp instruments. Unwrapped or unbagged panels or shingles must be immediately lowered to the ground via covered dust-tight chute, crane or hoist, or placed in an impervious waste bag or wrapped in plastic sheeting and lowered to the ground no later than the end of the work shift. Place debris into a 6-mil minimum thickness disposal bag or other approved container. Once the material is in the disposal bag, apply additional water as needed to achieve "adequately wet" conditions for NESHAP compliance. Place bagged asbestos waste under negative pressure with the use of a HEPA vacuum, goose neck and duct tape to seal the bag, wash to remove any visible contamination and place into a second 6-mil minimum thickness disposal bag. Containerize asbestos containing waste while wet. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

3.2.11.6 Gaskets

Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers, signs, and maintain all other requirements for asbestos control area except local exhaust. Gaskets must be thoroughly wetted with amended water or wetting agent prior to removal and immediately placed in a disposal container. If a gasket is visibly deteriorated and unlikely to be removed intact, removal must be undertaken within a glovebag. Any scraping to remove residue must be performed wet. Place debris into a 6-mil minimum thickness disposal bag or other approved container. Once the material is in the disposal bag, apply additional water as needed to achieve "adequately wet" conditions for NESHAP compliance. Place bagged asbestos waste under negative pressure with the use of a HEPA vacuum, goose neck and duct tape to seal the bag, wash to remove any visible contamination and place into a second 6-mil minimum thickness disposal bag. Containerize asbestos containing waste while wet. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

3.2.12 Encapsulation Procedures

3.2.12.1 Preparation of Test Patches

Install three test patches of encapsulant in as required. Use airless spray at the lowest pressure and as recommended by the encapsulant manufacturer. Follow exactly the manufacturer's instructions for thinning recommendations, application procedures and rates. Curing time must be not less than five days or that recommended by the manufacturer, whichever is more. A test patch must be 9 square feet in size.

3.2.12.2 Field Testing

Field test the encapsulation test patches in accordance with ASTM E1494, paragraph "Required Field Test,'' in the presence of the Contracting Officer. Keep a written record of the testing procedures and test results. Upon successful testing of the encapsulant, submit a signed statement to the Contracting Officer certifying that the encapsulant is suitable for installation on the particular asbestos containing material.

3.2.12.3 Large-Scale Application

Apply encapsulant using the same equipment and procedures as employed for the test patches. Keep the encapsulant material stirred to prevent settling. Keep a clean work area. Change pre-filters in the ventilation equipment as soon as they appear clogged by encapsulant aerosol or pressure differential drops below 0.02 Hg.

3.2.13 Abatement of Asbestos Contaminated Soil

Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers, signs, and maintain all other requirements for asbestos control area except local exhaust. Asbestos contaminated soil must be removed from areas to a minimum depth of 2 inches. Abatement of asbestos contaminated soil must be performed in accordance with all federal, state, and local regulations. Soil must be thoroughly dampened with amended water and then removed by manual shoveling into labeled containers. Place debris into a 6-mil minimum thickness disposal bag or other approved container. Once the material is in the disposal bag, apply additional water as needed to achieve ''adequately wet" conditions for NESHAP compliance. Place bagged asbestos waste under negative pressure with the use of a HEPA vacuum, goose neck and duct tape to seal the bag, wash to remove any visible contamination and place into a second 6-mil minimum thickness disposal bag. Containerize asbestos containing waste while wet. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

3.2.14 Air Sampling

Perform sampling of airborne concentrations of asbestos fibers in accordance with 29 CFR 1926.1101, the Contractor's air monitoring plan, applicable local, state and federal regulations, and as specified herein. Sampling performed in accordance with 29 CFR 1926.1101 must be performed by the PQP. Sampling performed for environmental and quality control reasons must be performed by the PQP. Unless otherwise specified, use NIOSH Method 7400 for sampling and analysis. Monitoring may be duplicated by the Government at the discretion of the Contracting Officer. If the air sampling results obtained by the Government differ from those results obtained by the Contractor, the Government will determine which results predominate. Results of breathing zone samples must be made available to the tested employees and Contracting Officer.. Submit all documentation regarding initial exposure assessments, negative exposure assessments, and air-monitoring results.

3.2.14.1 Sampling Prior to Asbestos Work

Provide area air sampling and establish the baseline one day prior to the masking and sealing operations for each demolition removal, and encapsulation site. Establish the background by performing area sampling in similar but uncontaminated sites in the building.

3.2.14.2 Sampling During Asbestos Work

The PQP must provide personal and area sampling as indicated in 29 CFR 1926.1101 and governing environmental regulations. Breathing zone samples must be taken for at least 25 percent of the workers in each shift, or a minimum of two, whichever is greater. Air sample fiber counting must be completed and results provided within 24-hours (breathing zone samples), and 48 hours (environmental/clearance monitoring) after completion of a sampling period. In addition, provided the same type of work is being performed, provide area sampling at least once every work shift close to the work inside the enclosure, outside the clean room entrance to the enclosure, and at the exhaust opening of the local exhaust system. If sampling outside the enclosure shows airborne levels have exceeded background or 0.01 fibers per cubic centimeter, whichever is greater, stop all work, correct the condition(s) causing the increase, and notify the Contracting Officer immediately. Where alternate methods are used, perform personal and area air sampling at locations and frequencies that accurately characterize the evolving airborne asbestos levels. The written results must be signed by testing laboratory analyst, testing laboratory principal and the Contractor's PQP. The air sampling results must be documented on a Contractor's daily air monitoring log.

The PQP must provide personal sampling as indicated in 29 CFR 1926.1101. Breathing zone samples must be taken for at least 25 percent of the workers in each shift, or a minimum of two, whichever is greater. Breathing zone samples must be taken for at least 25 percent of the workers in each shift, or a minimum of two, whichever is greater. Air sample fiber counting must be completed and results provided within 24-hours (breathing zone samples), and 48 hours (environmental/clearance monitoring) after completion of a sampling period. At the same time the PQP must provide area sampling close to the work inside the enclosure, outside the clean room entrance to the enclosure, and at the exhaust opening of the local exhaust system. In addition, provided the same type of work is being performed, the PQP must provide area sampling once every work shift close to the work inside the enclosure, outside the clean room entrance to the enclosure, and at the exhaust opening of the local exhaust system. If sampling outside the enclosure shows airborne levels have exceeded background or 0.01 fibers per cubic centimeter, whichever is greater, stop all work, correct the condition(s) causing the increase, and notify the Contracting Officer immediately. Where alternate methods are used, perform personal and area air sampling at locations and frequencies that accurately characterize the evolving airborne asbestos levels. The written results must be signed by testing laboratory analyst, testing laboratory principal and the Contractor's PQP. The air sampling results must be documented on a Contractor's daily air monitoring log.

3.2.14.3 Final Clearance Requirements, NIOSH PCM Method

For PCM sampling and analysis using NIOSH NMAM Method 7400, the fiber concentration inside the abated regulated area, for each airborne sample, must be less than 0.01 f/cc. The abatement inside the regulated area is considered complete when every PCM final clearance sample is below the

clearance limit. If any sample result is greater than 0.01 total f/cc, the asbestos fiber concentration (asbestos f/cc) must be confirmed from that same filter using NIOSH NMAM Method 7402 (TEM) at no additional cost to the Government. If any confirmation sample result is greater than 0.01 asbestos f/cc, abatement is incomplete and cleaning must be repeated at no additional cost to the Government. Upon completion of any required recleaning, resampling with results to meet the above clearance criteria must be done at no additional cost to the Government.

3.2.14.4 Final Clearance Requirements, EPA TEM Method

For EPA TEM sampling and analysis, using the EPA Method specified in 40 CFR 763, abatement inside the regulated area is considered complete when the arithmetic mean asbestos concentration of the five inside samples is less than or equal to 70 structures per square millimeter (70 S/mm). When the arithmetic mean is greater than 70 S/mm, the three blank samples must be analyzed. If the three blank samples are greater than 70 S/mm, resampling must be done. If less than 70 S/mm, the five outside samples must be analyzed and a z-test analysis performed. When the z-test results are less than 1.65, the decontamination must be considered complete. If the z-test results are more than 1.65, the abatement is incomplete and cleaning must be repeated. Upon completion of any required recleaning, resampling with results to meet the above clearance criteria must be done at no additional cost to the Government.

3.2.14.5 Sampling After Final Clean-Up (Clearance Sampling)

Provide area sampling of asbestos fibers using aggressive air sampling techniques as defined in the EPA 560/5-85-024 and establish an airborne asbestos concentration of less than 0.01 fibers per cubic centimeter after final clean-up but before removal of the enclosure or the asbestos work control area. After final cleanup and the asbestos control area is dry but prior to clearance sampling, the PQP must perform a visual inspection in accordance with ASTM E1368 to ensure that the asbestos control and work area is free of any accumulations of dirt, dust, or debris. Prepare a written report signed and dated by the PQP documenting that the asbestos control area is free of dust, dirt, and debris and all waste has been removed. Perform samples as required per regulations. Use transmission electron microscopy (TEM) to analyze clearance samples and report the results in accordance with current NIOSH criteria. The asbestos fiber counts from these samples must be less than 0.01 fibers per cubic centimeter or be not greater than the background, whichever is greater. If any of the final samples indicate a higher value take appropriate actions to re-clean the area and repeat the sampling and TEM analysis at no additional cost to the Government.

3.2.14.6 Air Clearance Failure

If clearance sampling results fail to meet the final clearance requirements, pay all costs associated with the required recleaning, resampling, and analysis, until final clearance requirements are met.

3.2.15 Lock-Down

Prior to removal of plastic barriers and after pre-clearance clean up of gross contamination, the PQP must conduct a visual inspection of all areas affected by the removal, encapsulation in accordance with ASTM E1368. Inspect for any visible fibers, and to ensure that encapsulants were applied evenly and appropriately. Spray apply a post removal (lock-down)

encapsulant to ceiling, walls, floors and other areas exposed in the removal area. The exposed area includes but is not limited to plastic barriers, furnishings and articles to be discarded as well as dirty change room, air locks for bag removal and decontamination chambers.

3.2.16 Site Inspection

While performing asbestos engineering control work, the Contractor must be subject to on-site inspection by the Contracting Officer who may be assisted by or represented by safety or industrial hygiene personnel. If the work is found to be in violation of this specification, the Contracting Officer or his representative will issue a stop work order to be in effect immediately and until the violation is resolved. All related costs including standby time required to resolve the violation must be at no additional cost to the Government.

3.3 CLEAN-UP AND DISPOSAL

3.3.1 Housekeeping

Essential parts of asbestos dust control are housekeeping and clean-up procedures. Maintain surfaces of the asbestos control area free of accumulations of asbestos fibers. Give meticulous attention to restricting the spread of dust and debris; keep waste from being distributed over the general area. Use HEPA filtered vacuum cleaners. DO NOT BLOW DOWN THE SPACE WITH COMPRESSED AIR. When asbestos removal is complete, all asbestos waste is removed from the work-site, and final clean-up is completed, the Contracting Officer will attest that the area is safe before the signs can be removed. After final clean-up and acceptable airborne concentrations are attained but before the HEPA unit is turned off and the enclosure removed, remove all pre-filters on the building HVAC system and provide new pre-filters. Dispose of filters as asbestos contaminated materials. Reestablish HVAC mechanical, and electrical systems in proper working order. The Contracting Officer will visually inspect all surfaces within the enclosure for residual material or accumulated dust or debris. The Contractor must re-clean all areas showing dust or residual materials. If re-cleaning is required, air sample and establish an acceptable asbestos airborne concentration after re-cleaning. The Contracting Officer must agree that the area is safe in writing before unrestricted entry is permitted. The Government must have the option to perform monitoring to determine if the areas are safe before entry is permitted.

3.3.2 Title to Materials

All waste materials, except as specified otherwise, become the property of the Contractor and must be disposed of as specified in applicable local, State, and Federal regulations and herein.

3.3.3 Disposal of Asbestos

3.3.3.1 Procedure for Disposal

Coordinate all waste disposal manifests with the Contracting Officer and host installation environmental function. Collect asbestos waste, contaminated waste water filters, asbestos contaminated water, scrap, debris, bags, containers, equipment, and asbestos contaminated clothing which may produce airborne concentrations of asbestos fibers and place in sealed fiber-proof, waterproof, non-returnable containers (e.g. double plastic bags 6 mils thick, cartons, drums or cans). Wastes within the

containers must be adequately wet in accordance with 40 CFR 61-SUBPART M. Affix a warning and Department of Transportation (DOT) label to each container including the bags or use at least 6 mils thick bags with the approved warnings and DOT labeling preprinted on the bag. Clearly indicate on the outside of each container the name of the waste generator and the location at which the waste was generated. Prevent contamination of the transport vehicle (especially if the transport vehicle is a rented truck likely to be used in the future for non-asbestos purposes). These precautions include lining the vehicle cargo area with plastic sheeting (similar to work area enclosure) and thorough cleaning of the cargo area after transport and unloading of asbestos debris is complete. Dispose of waste asbestos material at an Environmental Protection Agency (EPA) or State-approved asbestos landfill off Government property. For temporary storage, store sealed impermeable bags in asbestos waste drums or skids. An area for interim storage of asbestos waste-containing drums or skids must be assigned by the Contracting Officer or his authorized representative. Comply with 40 CFR 61-SUBPART M, State, regional, and local standards for hauling and disposal. Sealed plastic bags may be dumped from drums into the burial site unless the bags have been broken or damaged. Damaged bags must remain in the drum and the entire contaminated drum must be buried. Uncontaminated drums may be recycled. All persons handling containers with asbestos containing wastes must comply with applicable federal, state, and local regulations.

3.3.3.2 Asbestos Disposal Quantity Report

Direct the PQP to record and report, to the Contracting Officer, the amount of asbestos containing material removed and released for disposal. Deliver the report for the previous day at the beginning of each day shift with amounts of material removed during the previous day reported in linear feet or square feet as described initially in this specification and in cubic feet for the amount of asbestos containing material released for disposal.

Allow the PQP to inspect, record and report the amount of asbestos containing material removed and released for disposal on a daily basis. Exclude hazardous waste from waste reduction calculations in accordance with Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

-- End of Section --

SECTION 02 83 00

LEAD REMEDIATION
08/25

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)

ASSP Z9.2	(2018) Fundamentals Governing the Design and Operation of Local Exhaust Ventilation Systems

ASTM INTERNATIONAL (ASTM)

ASTM E1644	(2025) Standard Practice for Hot Plate Digestion of Dust Wipe Samples for the Determination of Lead
ASTM E1726	(2025) Standard Practice for Preparation of Soil Samples by Hotplate Digestion for Subsequent Lead Analysis
ASTM E1727	(2016) Standard Practice for Field Collection of Soil Samples for Subsequent Lead Determination
ASTM E1728/E1728M	(2024) Standard Practice for Collection of Settled Dust Samples Using Wipe Sampling Methods for Subsequent Lead Determination
ASTM E1792	(2024) Standard Specification for Wipe Sampling Materials for Lead in Surface Dust
ASTM E3193	(2023) Standard Test Method for Measurement of Lead (Pb) by Flame Atomic Absorption Spectrophotometry (FAAS)
ASTM E3203	(2024; Rev A) Standard Test Method for Determination of Lead by Inductively Coupled Plasma-Optical Emission Spectroscopy (ICP-OES)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 701	(2023; ERTA 1 2023) Standard Methods of Fire Tests for Flame Propagation of Textiles and Films

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2024) Safety -- Safety and Occupational

Health (SOH) Requirements

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT (HUD)

HUD 6780	(1995; Rev July 2012) Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing (2nd Edition)

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1926.21	Safety Training and Education
29 CFR 1926.33	Access to Employee Exposure and Medical Records
29 CFR 1926.55	Gases, Vapors, Fumes, Dusts, and Mists
29 CFR 1926.59	Hazard Communication
29 CFR 1926.62	Lead
29 CFR 1926.65	Hazardous Waste Operations and Emergency Response
29 CFR 1926.103	Respiratory Protection
29 CFR 1926.1126	Chromium
29 CFR 1926.1127	Cadmium
40 CFR 260	Hazardous Waste Management System: General
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 263	Standards Applicable to Transporters of Hazardous Waste
40 CFR 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 265	Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 268	Land Disposal Restrictions
40 CFR 745	Lead-Based Paint Poisoning Prevention in Certain Residential Structures
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements

49 CFR 174	Carriage by Rail
49 CFR 175	Carriage by Aircraft
49 CFR 176	Carriage **by** Vessel
49 CFR 178	Specifications for Packagings

UL SOLUTIONS (UL)

UL 586	(2009; Reprint Sep 2022) UL Standard for Safety High-Efficiency Particulate, Air Filter Units

1.2 DEFINITIONS

1.2.1 Abatement

Measures defined in 40 CFR 745, Section 223, designed to permanently eliminate lead-based paint hazards.

1.2.2 Action Level

Employee exposure, without regard to use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter of air averaged over an 8-hour period; to an airborne concentration of cadmium of 2.5 micrograms per cubic meter of air averaged over an 8-hour period; to an airborne concentration of chromium (VI) of 2.5 micrograms per cubic meter of air averaged over an 8-hour period.

1.2.3 Area Sampling

Sampling of lead, cadmium, chromium concentrations within the lead, cadmium, chromium control area and inside the physical boundaries which is representative of the airborne lead, cadmium, chromium concentrations but is not collected in the breathing zone of personnel (approximately 5 to 6 feet above the floor).

1.2.4 Cadmium Permissible Exposure Limit (PEL)

Five micrograms per cubic meter of air as an 8-hour time weighted average as determined by 29 CFR 1926.1127. If an employee is exposed for more than 8-hours in a work day, determine the PEL by the following formula:

PEL (micrograms/cubic meter of air) = 40/No. hrs worked per day

1.2.5 Certified Industrial Hygienist (CIH)

As used in this section refers to a person retained by the Contractor who is certified as an industrial hygienist and who is trained in the recognition and control of lead, cadmium and chromium hazards in accordance with current federal, State, and local regulations. CIH must be certified for comprehensive practice by the Board for Global EHS Credentialing (BGC). The Certified Industrial Hygienist must be independent of the Contractor and must have no employee or employer relationship which could constitute a conflict of interest.

1.2.6 Child-Occupied Facility

Real property which is a building or portion of a building constructed prior to 1978 visited regularly by the same child, 6-years of age or under, on at least two different days within any week (Sunday through Saturday period), provided that each day's visit lasts at least 3-hours, and the combined annual visits last at least 60-hours. Child-occupied facilities include but are not limited to, day-care centers, preschools and kindergarten classrooms.

1.2.7 Chromium Permissible Exposure Limit (PEL)

Five micrograms per cubic meter of air as an 8-hour time weighted average as determined by 29 CFR 1926.1126. If an employee is exposed for more than 8-hours in a work day, determine the PEL by the following formula:

PEL (micrograms/cubic meter of air) = 40/No. hrs worked per day

1.2.8 Competent Person (CP)

As used in this section, refers to a person employed by the Contractor who is trained in the recognition and control of lead, cadmium and chromium hazards in accordance with current federal, State, and local regulations and has the authority to take prompt corrective actions to control the lead, cadmium and chromium hazard. The Contractor may provide more than one CP as required to supervise and monitor the work. The CP must be a Certified Industrial Hygienist (CIH) certified by the Board for Global EHS Credentialing (BGC) or a Certified Safety Professional (CSP) certified by the Board of Certified Safety Professionals or a licensed lead-based paint abatement Supervisor/Project Designer in the State of Arkansas, federally.

1.2.9 Contaminated Room

Refers to a room for removal of contaminated personal protective equipment (PPE)

1.2.10 Decontamination Shower Facility

That facility that encompasses a clean clothing storage room, and a contaminated clothing storage and disposal rooms, with a shower facility in between.

1.2.11 Deleading

Activities conducted by a person who offers to eliminate lead-based paint or lead-based paint hazards or to plan such activities in commercial buildings, bridges or other structures.

1.2.12 Eight-Hour Time Weighted Average (TWA)

Airborne concentration of lead, cadmium, chromium to which an employee is exposed, averaged over an 8-hour workday as indicated in 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127.

1.2.13 High Efficiency Particulate Air (HEPA) Filter Equipment

HEPA filtered vacuuming equipment with a UL 586 filter system capable of collecting and retaining lead, cadmium, chromium contaminated particulates. A high efficiency particulate filter demonstrates at least

99.97 percent efficiency against 0.3 micron or larger size particles.

1.2.14 Lead

Metallic lead, inorganic lead compounds, and organic lead soaps. Excludes other forms of organic lead compounds. The use of the term lead in this section also refers to paints which contain detectable concentrations of cadmium and chromium. For the purpose of the section lead-based paint (LBP) and paint with lead (PWL), cadmium and chromium are included.

1.2.15 Lead-Based Paint (LBP)

Paint or other surface coating that contains lead in excess of 1.0 milligrams per centimeter squared or 0.5 percent by weight.

1.2.16 Lead-Based Paint Activities

In the case of target housing or child occupied facilities, lead-based paint activities include; a lead-based paint inspection, a risk assessment, or abatement of lead-based paint hazards.

1.2.17 Lead-Based Paint Hazards

Paint-lead hazard, dust-lead hazard or soil-lead hazard as identified in 40 CFR 745, Section 65. Any condition that causes exposure to lead from lead-contaminated dust, lead-contaminated soil, lead-based paint that is deteriorated or present in accessible surfaces, friction surfaces, or impact surfaces that would result in adverse human health effects.

1.2.18 Lead, Cadmium, Chromium Control Area

A systemof control methods to prevent the spread of lead, cadmium, chromium dust, paint chips or debris to adjacent areas that may include temporary containment, floor or ground cover protection, physical boundaries, and warning signs to prevent unauthorized entry of personnel. HEPA filtered local exhaust equipment may be used as engineering controls to further reduce personnel exposures or building/outdoor environmental contamination.

1.2.19 Lead Permissible Exposure Limit (PEL)

Fifty micrograms per cubic meter of air as an 8-hour time weighted average as determined by 29 CFR 1926.62. If an employee is exposed for more than 8-hours in a work day, determine the PEL by the following formula:

PEL (micrograms/cubic meter of air) = 400/No. hrs worked per day

1.2.20 Material Containing Lead/Paint with Lead (MCL/PWL)

Any material, including paint, which contains lead as determined by the testing laboratory using a valid test method. The requirements of this section does not apply if no detectable levels of lead are found using a quantitative method for analyzing paint or MCL using laboratory instruments with specified limits of detection (usually 0.01 percent). An X-Ray Fluorescence (XRF) instrument is not considered a valid test method.

1.2.21 Personal Sampling

Sampling of airborne lead, cadmium, chromium concentrations within the breathing zone of an employee to determine the 8-hour time weighted average

concentration in accordance with 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127. Samples must be representative of the employees' work tasks. Breathing zone must be considered an area within a hemisphere, forward of the shoulders, with a radius of 6 to 9 inches and centered at the nose or mouth of an employee.

1.2.22 Physical Boundary

Area physically roped or partitioned off around lead, cadmium, chromium control area to limit unauthorized entry of personnel.

1.2.23 Target Housing

Residential real property which is housing constructed prior to 1978, except housing for the elderly or persons with disabilities (unless any one or more children age 6-years or under resides or is expected to reside in such housing for the elderly or persons with disabilities) or any zero bedroom dwelling.

1.3 DESCRIPTION

Construction activities impacting PWL or material containing lead, cadmium, chromium which are covered by this specification include the demolition or removal of material containing lead, cadmium, chromium in good condition, located Exterior Windows and walls of guard shacks, as per HAZMAT report, and as indicated on the drawings. Presence of hazardous materials shall be checked and verified prior to the commencement of work. The work covered by this section includes work tasks and the precautions specified in this section for the protection of building occupants and the environment during and after the performance of the hazard abatement activities.

1.3.1 Protection of Existing Areas To Remain

Project work including, but not limited to, lead, cadmium, chromium hazard abatement work, storage, transportation, and disposal must be performed without damaging or contaminating adjacent work and areas. Where such work or areas are damaged or contaminated, restore work and areas to the original condition.

1.3.2 Coordination with Other Work

Coordinate with work being performed in adjacent areas to ensure there are no exposure issues. Explain coordination procedures in the Lead, Cadmium, Chromium Compliance Plan and describe how the Contractor prevents lead, cadmium and chromium exposure to other contractors and Government personnel performing work unrelated to lead, cadmium and chromium activities.

1.3.3 Sampling and Analysis

Submit a log of the analytical results from sampling conducted during the abatement. Keep the log of results current with project activities and brief the results to the Contracting Officer as analytical results are reported.

1.3.3.1 Dust Wipe Materials, Sampling and Analysis

Sampling must conform to ASTM E1728/E1728MASTM E1792. Analysis must conform to ASTM E3193, ASTM E3203 REV A, and ASTM E1644.

1.3.3.2 Soil Sampling and Analysis

Sampling must conform to ASTM E1727. Analysis must conform to ASTM E3193, ASTM E3203 REV A, ASTM E1726, and state and local regulations.

1.3.3.3 Clearance Monitoring

a. Collect dust wipe samples inside the lead, cadmium and chromium hazard control area after the final visual inspection in the quantities and at the locations specified.

(1) Floors .

(2) Interior Window Sills .

(3) Window Troughs.

b. Collect exterior bare soil samples inside the lead, cadmium and chromium hazard control area after the final visual inspection in the quantities and at the locations specified.

(1) Near the building foundation .

(2) Nearby Play areas

1.3.4 Clearance Requirements

Target housing and child occupied facilities clearance levels.

(1) Floors 5 micrograms/square foot.

(2) Interior Window Sills 40 micrograms/square foot.

(3) Window Troughs 100 micrograms/square foot.

(4) Bare soils in play areas accessible by children

(5) Bare soils in all other areas .

1.4 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Competent Person Qualifications; G,

Training Certification; G,

Occupational and Environmental Assessment Data Report; G,

Medical Examinations; G,

Lead, Cadmium, Chromium Waste Management Plan; G,

Licenses, Permits and Notifications; G,

Occupant Protection Plan; G,

Lead, Cadmium, Chromium Compliance Plan; G,

Initial Sample Results; G,

Written Evidence of TSD Approval; G,

SD-03 Product Data

Respirators; G,

Vacuum Filters; G,

Negative Air Pressure System; G,

Materials and Equipment; G,

Expendable Supplies; G,

Local Exhaust Equipment; G,

Pressure Differential Automatic Recording Instrument; G,

Pressure Differential Log; G,

SD-06 Test Reports

Sampling and Analysis; G,

Occupational and Environmental Assessment Data Report; G,

Sampling Results; G,

Pressure Differential Recordings For Local Exhaust System; G,

SD-07 Certificates

Testing Laboratory; G,

Third Party Consultant Qualifications; G,

Occupant Notification; G,

Notification of the Commencement of LBP Hazard Abatement; G,

Clearance Certification; G,

SD-11 Closeout Submittals

Hazardous Waste Manifest; G,

Turn-In Documents or Weight Tickets; G,

Nonhazardous Manifest; G,

Bill Of Lading; G,

1.5 QUALITY ASSURANCE

1.5.1 Qualifications

1.5.1.1 Competent Person (CP)

Submit name, address, and telephone number of the CP selected to perform responsibilities specified in paragraph COMPETENT PERSON (CP) RESPONSIBILITIES. Provide documented construction project-related experience with implementation of OSHA's Lead in Construction standard 29 CFR 1926.62), Chromium standard (29 CFR 1926.1126), Cadmium standard (29 CFR 1926.1127) which shows ability to assess occupational and environmental exposure to lead, cadmium, chromium; experience with the use of respirators, personal protective equipment and other exposure reduction methods to protect employee health. Demonstrate a minimum of 5 years experience implementing OSHA's Lead in Construction standard (29 CFR 1926.62), Chromium standard (29 CFR 1926.1126), and Cadmium standard (29 CFR 1926.1127). Submit proper documentation that the CP is trained and licensed and certified in accordance with federal, State and local laws. The competent person must be a licensed lead-based paint abatement Supervisor/Project Designer in the State of Arkansas.

1.5.1.2 Training Certification

Submit a certificate for each worker and supervisor, signed and dated by the accredited training provider, stating that the employee has received the required lead, cadmium and chromium training specified in 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 40 CFR 745 and is certified to perform or supervise deleading, lead removal or demolition activities in the State of Arkansas.

1.5.1.3 Testing Laboratory

Submit the name, address, and telephone number of the testing laboratory selected to perform the air soil and wipe analysis, testing, and reporting of airborne concentrations of lead, cadmium and chromium. Use a laboratory participating in the EPA National Lead Laboratory Accreditation Program (NLLAP) by being accredited by either the American Association for Laboratory Accreditation (A2LA) or the American Industrial Hygiene Association (AIHA) and that is successfully participating in the Environmental Lead Proficiency Analytical Testing (ELPAT) program to perform sample analysis. Laboratories selected to perform blood lead analysis must be OSHA approved.

1.5.1.4 Third Party Consultant Qualifications

Submit the name, address and telephone number of the third party consultant selected to perform the wipe sampling for determining concentrations of lead, cadmium and chromium in dust. Submit proper documentation that the consultant is trained and certified as an inspector technician or inspector/risk assessor by the USEPA authorized State (or local) certification and accreditation program.

1.5.1.5 Certified Risk Assessor

The Certified Risk Assessor must be certified pursuant to 40 CFR 745, Section 226 or applicable state certifications and be responsible to

perform the clearance sampling, clearance sample data evaluation and summarize clearance sampling results in a section of the abatement report. The risk assessor must sign the abatement report to indicate clearance requirements for the contract have been met.

1.5.2 Requirements

1.5.2.1 Competent Person (CP) Responsibilities

a. Verify training meets all federal, State, and local requirements.

b. Review and approve Lead, Cadmium, Chromium Compliance Plan for conformance to the applicable referenced standards.

c. Continuously inspect LBP/PWL or MCL work for conformance with the approved plan.

d. Perform (or oversee performance of) air sampling.

e. Ensure work is performed in strict accordance with specifications at all times.

f. Control work to prevent hazardous exposure to human beings and to the environment at all times.

g. Supervise final cleaning of the lead, cadmium, chromium control area, take clearance wipe samples if necessary; review clearance sample results and make recommendations for further cleaning.

h. Certify the conditions of the work as called for elsewhere in this specification.

i. The CP must be certified pursuant to 40 CFR 745, Section 226 and is responsible for development and implementation of the occupant protection plan, the abatement report and supervise lead, cadmium and chromium hazard abatement work activities.

1.5.2.2 Lead, Cadmium, Chromium Compliance Plan

Submit a detailed job-specific plan of the work procedures to be used in the disturbance of lead, cadmium and chromium, LBP/PWL or MCL. Include in the plan a sketch showing the location, size, and details of lead, cadmium, chromium control areas, critical barriers, physical boundaries, location and details of decontamination facilities, viewing ports, and mechanical ventilation system. Include a description of equipment and materials, work practices, controls and job responsibilities for each activity from which lead, cadmium, chromium is emitted. Include in the plan, eating, drinking, smoking, hygiene facilities and sanitary procedures, interface of trades, sequencing of lead, cadmium, chromium related work, collected waste water and dust containing lead, cadmium, chromium and debris, air sampling, respirators, personal protective equipment, and a detailed description of the method of containment of the operation to ensure that lead, cadmium, chromium is not released outside of the lead, cadmium, chromium control area. Include site preparation, cleanup and clearance procedures. Include occupational and environmental sampling, training and strategy, sampling and analysis strategy and methodology, frequency of sampling, duration of sampling, and qualifications of sampling personnel in the air sampling portion of the plan. Include a description of arrangements made among contractors on multicontractor worksites to inform affected employees and

to clarify responsibilities to control exposures.

The plan must be developed and signed by a certified Lead Project Designer in the State of Arkansas and federally. The plan must include the name and certification number of the person signing the plan.

In occupied buildings, the plan must also include an occupant protection program that describes the measures that are taken during the work to notify and protect the building occupants.

1.5.2.3 Occupational and Environmental Assessment Data Report

If initial monitoring is necessary, submit occupational and environmental sampling results to the Contracting Officer within three working days of collection, signed by the testing laboratory employee performing the analysis, the employee that performed the sampling, and the CP.

In order to reduce the full implementation of 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 the Contractor must provide documentation. Submit a report that supports the determination to reduce full implementation of the requirements of 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 and supporting the Lead, Cadmium, Chromium Compliance Plan.

a. The initial monitoring must represent each job classification, or if working conditions are similar to previous jobs by the same employer, provide previously collected exposure data that can be used to estimate worker exposures per 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127. The data must represent the worker's regular daily exposure to lead, cadmium, chromium for stated work.

b. Submit worker exposure data gathered during the task based trigger operations of 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 with a complete process description. This includes manual demolition, manual scraping, manual sanding, heat gun, power tool cleaning, rivet busting, cleanup of dry expendable abrasives, abrasive blast enclosure removal, abrasive blasting, welding, cutting and torch burning where lead, cadmium and chromium containing coatings are present.

c. The initial assessment must determine the requirement for further monitoring and the need to fully implement the control and protective requirements including the lead, cadmium, chromium compliance plan per 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127.

1.5.2.4 Medical Examinations

Submit documentation of workers who performed lead, cadmium, chromium activities including the name of each employee, type of exam received, and date of the exam. The documentation must also include a signed statement that the medical examination was reviewed by the contractor's Safety Manager and Industrial Hygienist stating that the listed personnel have received the required medical examination in accordance with 29 CFR 1926.62 and the exam results are saved. Initial medical surveillance as required by 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 must be made available to all employees exposed to lead, cadmium, chromium at any time (one day) above the action level. Full medical surveillance must be made available to all employees on an annual basis who are or may be exposed to lead, cadmium and chromium in excess of the action level for more than 30 days a year or as required by 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127. Adequate records must show that employees meet the medical surveillance

requirements of 29 CFR 1926.33, 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 and 29 CFR 1926.103. Provide medical surveillance to all personnel exposed to lead, cadmium, chromium as indicated in 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127. Maintain complete and accurate medical records of employees for the duration of employment plus 30 years.

1.5.2.5 Training

Train each employee performing work that disturbs lead, cadmium, chromium, who performs LBP/MCL/PWL disposal, and air sampling operations prior to the time of initial job assignment and annually thereafter, in accordance with 29 CFR 1926.21, 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127, 40 CFR 745 and State Arkansas, federally, and local regulations where appropriate.

1.5.2.6 Respiratory Protection Program

a. Provide each employee required to wear a respirator a respirator fit test at the time of initial fitting and at least annually thereafter as required by 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127.

b. Establish and implement a respiratory protection program as required by 29 CFR 1926.103, 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 and 29 CFR 1926.55.

1.5.2.7 Hazard Communication Program

Establish and implement a Hazard Communication Program as required by 29 CFR 1926.59.

1.5.2.8 Lead, Cadmium, Chromium Waste Management

The Lead, Cadmium, Chromium Waste Management Plan must comply with applicable requirements of federal, State, and local hazardous waste regulations and address:

a. Identification and classification of wastes associated with the work.

b. Estimated quantities of wastes to be generated and disposed of.

c. Names and qualifications of each contractor that transports, stores, treats, or disposes of the wastes. Include the facility location and operator and a 24-hour point of contact. Furnish two copies of USEPA State (in accordance with Arkansas) and local hazardous waste permit applications permits manifests and USEPA Identification numbers.

d. Names and qualifications (experience and training) of personnel working on-site with hazardous wastes.

e. List of waste handling equipment to be used in performing the work, to include cleaning, volume reduction, and transport equipment.

f. Spill prevention, containment, and cleanup contingency measures including a health and safety plan to be implemented in accordance with 29 CFR 1926.65.

g. Work plan and schedule for waste containment, removal and disposal. Proper containment of the waste includes using acceptable waste containers (e.g., 55-gallon drums) as well as proper marking/labeling

of the containers. All drums must meet applicable United Nations (UN) requirements and DOT regulations. Clean up and containerize wastes daily.

h. Include any process that may alter or treat waste rendering a hazardous waste non hazardous.

i. Unit cost for hazardous waste disposal according to this plan.

1.5.2.9 Environmental, Safety and Health Compliance

In addition to the detailed requirements of this specification, comply with laws, ordinances, rules, and regulations of federal, State, and local authorities regarding lead, cadmium and chromium. Comply with the applicable requirements of the current issue of 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127, EM 385-1-1. Submit matters regarding interpretation of standards to the Contracting Officer for resolution before starting work. Where specification requirements and the referenced documents vary, the most stringent requirements apply. The following local and Arkansas State laws, ordinances, criteria, rules and regulations regarding removing, handling, storing, transporting, and disposing of lead, cadmium and chromium-contaminated materials apply:

a. EPA

b. Arkansas Department of Health (ADH)

c. OSHA

d. Licensing and certification in the state of Arkansas is required.

e. 40 CFR, PART 2561, Identification and Listing of Hazardous Waste

f. 40 CFR PART 745 - Lead-Based Paint Poisining Precention in Certain Residential Structures.

g. 49 CFR Parts 100-185 - Hazardous Materials Regulations

h. Hazardous Materials Transportation Act (HMTA), 49 U.S.C., 5101 et seq.

i. Toxic Subtances Control Act (TSCA), Title 15 U.S.C., Ch. 53: TOXIC SUBSTANCES CONTROL

1.5.3 Pressure Differential Recordings for Local Exhaust System

Provide a local exhaust system that creates a negative pressure of at least 0.02 inches of water relative to the pressure external to the enclosure and operate it continuously, 24-hours a day, until the temporary enclosure of the lead, cadmium, chromium control area is removed. Submit pressure differential recordings for each work day to the PQP and GC for review and to the Contracting Officer within 24-hours from the end of each work day.

1.5.4 Licenses, Permits and Notifications

Certify and submit in writing to the Regional Office of the EPA state's environmental protection agency responsible for lead hazard abatement activities and the Contracting Officer at least 10 days prior to the commencement of work that Lead Abatement licenses, permits and notifications have been obtained. All associated fees or costs incurred in

obtaining the licenses, permits and notifications are included in the contract price.

1.5.5 Occupant Protection Plan

The certified project designer must develop and implement an Occupant Protection Plan describing the measures and management procedures to be taken during lead, cadmium and chromium hazard abatement activities to protect the building occupants/building facilities and the outside environment from exposure to any lead, cadmium and chromium contamination while lead, cadmium and chromium hazard abatement activities are performed.

1.5.6 Pre-Construction Conference

Along with the CP, meet with the Contracting Officer to discuss in detail the Lead, Cadmium, Chromium Waste Management Plan and the Lead, Cadmium, Chromium Compliance Plan, including procedures and precautions for the work.

1.6 EQUIPMENT

1.6.1 Respirators

Furnish appropriate respirators approved by the National Institute for Occupational Safety and Health (NIOSH), Department of Health and Human Services, for use in atmospheres containing lead, cadmium and chromium dust, fume and mist. Respirators must comply with the requirements of 29 CFR 1926.62, 29 CFR 1926.1126, and 29 CFR 1926.1127.

1.6.2 Special Protective Clothing

Personnel exposed to lead, cadmium, chromium contaminated dust must wear proper disposable uncontaminated, reusable protective whole body clothing, head covering, gloves, eye, and foot coverings as required by 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 and applicable state and local regulations. Furnish proper disposable plastic or rubber gloves to protect hands. Reduce the level of protection only after obtaining approval from the CP.

1.6.3 Rental Equipment Notification

If rental equipment is to be used during PWL or MCL handling and disposal, notify the rental agency in writing concerning the intended use of the equipment.

1.6.4 Vacuum Filters

UL 586 labeled HEPA filters.

1.6.5 Equipment for Government Personnel

Furnish the Contracting Officer with two complete sets of personal protective equipment (PPE) daily, as required herein, for entry into and inspection of the lead, cadmium and chromium removal work within the lead, cadmium and chromium controlled area. Personal protective equipment must include disposable whole body covering, including appropriate foot, head, eye, and hand protection. PPE remains the property of the Contractor. The Government will provide respiratory protection for the Contracting Officer.

1.6.6 Abrasive Removal Equipment

The use of powered machine for vibrating, sanding, grinding, or abrasive blasting is prohibited unless equipped with local exhaust ventilation systems equipped with high efficiency particulate air (HEPA) filters.

1.6.7 Negative Air Pressure System

1.6.7.1 Minimum Requirements

Do not proceed with work in the area until containment is set up and HEPA filtration systems are in place. The negative air pressure system must meet the requirements of ASSP Z9.2 including approved HEPA filters in accordance with UL 586. Negative air pressure equipment must be equipped with new HEPA filters, and be sufficient to maintain a minimum pressure differential of minus 0.02 inch of water column relative to adjacent, unsealed areas. Negative air pressure system minimum requirements are listed as follows:

a. The unit must be capable of delivering its rated volume of air with a clean first stage filter, an intermediate filter and a primary HEPA filter in place.

b. The HEPA filter must be certified as being capable of trapping and retaining mono-disperse particles as small as 0.3 micrometers at a minimum efficiency of 99.97 percent.

c. The unit must be capable of continuing to deliver no less than 70 percent of rated capacity when the HEPA filter is 70 percent full or measures 2.5 inches of water static pressure differential on a magnehelic gauge.

d. Equip the unit with a manometer-type negative pressure differential monitor with minor scale division of 0.02 inch of water and accuracy within plus or minus 1.0 percent. The manometer must be calibrated daily as recommended by the manufacturer.

e. Equip the unit with a means for the operator to easily interpret the readings in terms of the volumetric flow rate of air per minute moving through the machine at any given moment.

f. Equip the unit with an electronic mechanism that automatically shuts the machine off in the event of a filter breach or absence of a filter.

g. Equip the unit with an audible horn that sounds an alarm when the machine has shut itself off.

h. Equip the unit with an automatic safety mechanism that prevents a worker from improperly inserting the main HEPA filter.

1.6.7.2 Auxiliary Generator

Provide an auxiliary generator with capacity to power a minimum of 50 percent of the negative air machines at any time during the work. When power fails, the generator controls must automatically start the generator and switch the negative air pressure system machines to generator power. The generator must not present a carbon monoxide hazard to workers.

1.6.8 Vacuum Systems

Vacuum systems must be suitably sized for the project, and filters must be capable of trapping and retaining all mono-disperse particles as small as 0.3 micrometers (mean aerodynamic diameter) at a minimum efficiency of 99.97 percent. Properly dispose of used filters that are being replaced.

1.6.9 Heat Blower Guns

Heat blower guns must be flameless, electrical, paint-softener type with controls to limit temperature to less than 1,100 degrees F. Heat blower must be (grounded) 120 volts ac, and must be equipped with cone, fan, glass protector and spoon reflector nozzles.

1.7 PROJECT/SITE CONDITIONS

1.7.1 Protection of Existing Work to Remain

Perform work without damage or contamination of adjacent areas. Where existing work is damaged or contaminated, restore work to its original condition or better as determined by the Contracting Officer.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

Keep materials and equipment needed to complete the project available and on the site. Submit a description of the materials and equipment required; including Safety Data Sheets (SDSs) for material brought onsite to perform the work.

2.1.1 Expendable Supplies

Submit a description of the expendable supplies required.

2.1.1.1 Polyethylene Bags

Disposable bags must be polyethylene plastic and be a minimum of 6 mils thick (4 mils thick if double bags are used) or any other thick plastic material shown to demonstrate at least equivalent performance; and capable of being made leak-tight. Leak-tight means that solids, liquids or dust cannot escape or spill out.

2.1.1.2 Polyethylene Leak-tight Wrapping

Wrapping used to wrap lead, cadmium, chromium contaminated debris must be polyethylene plastic that is a minimum of 6 mils thick or any other thick plastic material shown to demonstrate at least equivalent performance.

2.1.1.3 Polyethylene Sheeting

Sheeting must be polyethylene plastic with a minimum thickness of 6 mil, or any other thick plastic material shown to demonstrate at least equivalent performance; and be provided in the largest sheet size reasonably accommodated by the project to minimize the number of seams. Where the project location constitutes an out of the ordinary potential for fire, or where unusual fire hazards cannot be eliminated, provide flame-resistant polyethylene sheets which conform to the requirements of NFPA 701.

2.1.1.4 Tape and Adhesive Spray

Tape and adhesive must be capable of sealing joints between polyethylene sheets and for attachment of polyethylene sheets to adjacent surfaces. After dry application, tape or adhesive must retain adhesion when exposed to wet conditions, including amended water or wetting agents. Tape must be minimum 2 inches wide, industrial strength.

2.1.1.5 Containers

When used, containers must be leak-tight and be labeled in accordance with EPA, DOT and OSHA standards and UN Regulations.

2.1.1.6 Chemical Paint Strippers

Chemical paint strippers must not contain methylene chloride, n-methylpyrrodlidione, or other regulated solvents, and be formulated to prevent stain, discoloration, or raising of the substrate materials.

2.1.1.7 Chemical Paint Stripper Neutralizer

Neutralizers for paint strippers must be compatible with the substrate and suitable for use with the chemical stripper that has been applied to the surface.

2.1.1.8 Detergents and Cleaners

Detergents or cleaning agents must not contain trisodium phosphate and have demonstrated effectiveness in lead, cadmium and chromium control work using cleaning techniques specified by HUD 6780 guidelines.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 Protection

3.1.1.1 Notification

a. Notify the Contracting Officer 30 days prior to the start of any lead, cadmium and chromium work.

b. Occupant Notification

Submit occupant written acknowledgment of the delivery of lead hazard information pamphlet (EPA 747-K-99-001 "Protect Your Family From Lead in Your Home") prior to commencing the renovation work for each affected unit using language provided in 40 CFR 745 Subpart E.

c. Notification of the Commencement of LBP Hazard Abatement

Submit a copy of the notification of the commencement of LBP hazard abatement to the required parties according to the procedures established by Arkansas State, Federal, and Pine Bluff Arsenal.

3.1.1.2 Lead, Cadmium, Chromium Control Area

a. Physical Boundary - Provide physical boundaries around the lead, cadmium, chromium control area by roping off the area designated in the

work plan or providing curtains, portable partitions or other enclosures to ensure that lead, cadmium and chromium does not escape outside of the lead, cadmium and chromium control area. Prohibit the general public from accessing the lead, cadmium, chromium control areas.

b. Warning Signs - Provide warning signs at approaches to lead, cadmium, chromium control areas. Locate signs at such a distance that personnel may read the sign and take the necessary precautions before entering the area. Signs must comply with the requirements of 29 CFR 1926.62 and applicable state and local regulations.

3.1.1.3 Furnishings

The Government will remove furniture and equipment from the building before lead, cadmium and chromium work begins.

Furniture and equipment remaining in the building lead, cadmium, chromium control area. Protect and cover furnishings or remove furnishings from the work area and store in a location approved by the Contracting Officer.

3.1.1.4 Heating, Ventilating and Air Conditioning (HVAC) Systems

Shut down, lock out, and isolate HVAC systems that supply, exhaust, or pass through the lead, cadmium, chromium control areas. Seal intake and exhaust vents in the lead, cadmium, chromium control area with 6 mil plastic sheet and tape. Seal seams in HVAC components that pass through the lead, cadmium, chromium control area. Provide temporary HVAC system for areas in which HVAC has been shut down outside the lead, cadmium, chromium control area.

3.1.1.5 Local Exhaust System

Provide a local exhaust system in the lead, cadmium, chromium control area in accordance with ASSP Z9.2, 29 CFR 1926.62, 29 CFR 1926.1126 and 29 CFR 1926.1127 that provides at least **4** air changes per hour inside of the negative pressure enclosure. Local exhaust equipment must be operated 24-hours per day, until the lead, cadmium, chromium control area is removed and must be leak proof to the filter and equipped with HEPA filters. Maintain a minimum pressure differential in the lead, cadmium, chromium control area of minus 0.02 inch of water column relative to adjacent, unsealed areas. Provide continuous 24-hour per day monitoring of the pressure differential with a pressure differential automatic recording instrument. The building ventilation system must not be used as the local exhaust system for the lead, cadmium, chromium control area. Filters on exhaust equipment must conform to ASSP Z9.2 and UL 586. Terminate the local exhaust system out of doors and remote from any public access or ventilation system intakes.

3.1.1.6 Negative Air Pressure System Containment

a. Operate the negative air pressure systems to provide at least 10 air changes per hour inside the containment. Operate the local exhaust unit equipment continuously until the containment is removed. Smoke test the negative air pressure system for leaks at the beginning of each shift. The certified supervisor is responsible to continuously monitor and keep a pressure differential log with an automatic manometric recording instrument. Notify the Contracting Officer immediately **if** the pressure differential falls below the prescribed minimum. Submit the continuously monitored pressure differential log,

as specified. Do not use the building ventilation system as the local exhaust system. Terminate the local exhaust system out of doors unless the Contracting Officer allows an alternate arrangement. All filters must be new at the beginning of the project and be periodically changed as necessary to maintain specified pressure differential and disposed of as lead, cadmium and chromium contaminated waste.

b. Discontinuing Negative Air Pressure System. Operate the negative air pressure system continuously during abatement activities unless otherwise authorized by the Contracting Officer. At the completion of the project, units must be run until full cleanup has been completed and final clearance testing requirements have been met. Dismantling of the negative air pressure systems must conform to written decontamination procedures be approved by the Contracting Officer be as presented in the Lead, Cadmium, Chromium Compliance Plan. Seal the HEPA filter machine intakes with polyethylene to prevent environmental contamination.

3.1.1.7 Decontamination Shower Facility

Provide clean and contaminated change rooms and shower facilities in accordance with this specification and 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127.

3.1.1.8 Eye Wash Station

Provide suitable facilities within the work area for quick drenching or flushing of the eyes where eyes may be exposed to injurious corrosive materials.

3.1.1.9 Mechanical Ventilation System

a. Use adequate ventilation to control personnel exposure to lead, cadmium and chromium in accordance with 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127. To the extent feasible, use local exhaust ventilation or other collection systems, approved by the CP. Evaluate and maintain local exhaust ventilation systems in accordance with 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127.

b. Vent local exhaust outside the building and away from building ventilation intakes or ensure system is connected to HEPA filters.

c. Use locally exhausted, power actuated tools or manual hand tools.

3.1.1.10 Personnel Protection

Personnel must wear and use protective clothing and equipment as specified herein. Eating, smoking, or drinking or application of cosmetics is not permitted in the lead, cadmium, chromium control area. No one is permitted in the lead, cadmium, chromium control area unless they have been appropriately trained, medically cleared, and provided with protective equipment.

3.2 ERECTION

3.2.1 Lead, Cadmium, Chromium Control Area Requirements

Establish a lead, cadmium, chromium control area by completely establishing barriers and physical boundaries around the area or structure where PWL or

MCL removal operations are performed.

Full containment - Contain removal operations by the use of critical barriers and HEPA filtered exhaust a negative pressure enclosure system with decontamination facilities and with HEPA filtered exhaust if required by the CP. For containment areas larger than 1,000 square feet install a minimum of two 18 inch square viewing ports. Locate ports to provide a view of the required work from the exterior of the enclosed contaminated area. Glaze ports with laminated safety glass.

3.3 APPLICATION

3.3.1 Lead, Cadmium, Chromium Work

Perform lead, cadmium, chromium work in accordance with approved Lead, Cadmium, Chromium Compliance Plan. Use procedures and equipment required to limit occupational exposure and environmental contamination with lead, cadmium, chromium when the work is performed in accordance with 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127or 40 CFR 745, and as specified herein. Dispose of all PWL or MCL and associated waste in compliance with federal, State, and local requirements.

3.3.2 Paint with Lead, Cadmium, Chromium or Material Containing Lead, Cadmium, Chromium Removal

Manual or power sanding or grinding of lead, cadmium, chromium surfaces or materials is not permitted unless tools are equipped with HEPA attachments or wet methods. The dry sanding or grinding of surfaces that contain lead, cadmium, chromium is prohibited. Provide methodology for removing lead, cadmium, chromium in the Lead, Cadmium, Chromium Compliance Plan. Select lead, cadmium, chromium removal processes to minimize contamination of work areas outside the control area with lead, cadmium, chromium contaminated dust or other lead, cadmium, chromium contaminated debris or waste and to ensure that unprotected personnel are not exposed to hazardous concentrations of lead, cadmium, chromium. Describe this removal process in the Lead, Cadmium, Chromium Compliance Plan.

Avoid flash rusting deterioration of the substrate.

Provide methodology for lead, cadmium and chromium, LBP/PWL removal abatement/control and processes to minimize contamination of work areas outside the control area with lead, cadmium, chromium contaminated dust or other lead, cadmium, chromium contaminated debris/waste and to ensure that unprotected personnel are not exposed to hazardous concentrations of lead, cadmium, chromium. Describe this lead,, cadmium and chromium, LBP/PWL removal/control process in the Lead, Cadmium, Chromium Compliance Plan.

3.3.2.1 Paint with Lead, Cadmium, Chromium or Material Containing Lead, Cadmium, Chromium - Indoor Removal

Perform manual removaland thermal cutting in the lead, cadmium, chromium control areas using enclosures, barriers or containments and powered locally exhausted tools equipped with HEPA filters. Collect residue and debris for disposal in accordance with federal, State, and local requirements.

3.3.2.2 Paint with Lead, Cadmium, Chromium or Material Containing Lead, Cadmium, Chromium - Outdoor Removal

Perform outdoor removal as indicated in federal, State, and local regulations and in the Lead, Cadmium, Chromium Compliance Plan. The worksite preparation (barriers or containments) must be job dependent and presented in the Lead, Cadmium, Chromium Compliance Plan.

3.3.3 Personnel Exiting Procedures

Whenever personnel exit the lead, cadmium, chromium controlled area, they must perform the following procedures and must not leave the work place wearing any clothing or equipment worn in the control area:

a. Vacuum all clothing before entering the contaminated change room.

b. Remove protective clothing in the contaminated change room, and place them in an approved impermeable disposal bag.

c. Shower.

d. Wash hands and face at the site, don appropriate disposable or uncontaminated reusable clothing, move to an appropriate shower facility, shower.

e. Change to clean clothes prior to leaving the clean clothes storage area.

3.4 FIELD QUALITY CONTROL

3.4.1 Tests

3.4.1.1 Air and Wipe Sampling

Conduct sampling for lead, cadmium, chromium in accordance with 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127, and as specified herein. Air and wipe sampling must be directed or performed by the CP.

a. The CP must be on the job site directing the air and wipe sampling and inspecting the PWL or MCL removal work to ensure that the requirements of the contract have been satisfied during the entire PWL or MCL operation.

b. Collect personal air samples on employees who are anticipated to have the greatest risk of exposure as determined by the CP. In addition, collect air samples on at least twenty-five percent of the work crew or a minimum of two employees, whichever is greater, during each work shift.

c. Submit results of air samples, signed by the CP, within 72-hours after the air samples are taken.

d. Conduct area air sampling daily, on each shift in which lead, cadmium and chromium and lead-based paint removal operations are performed, in areas immediately adjacent to the lead, cadmium and chromium control area. Conduct sufficient area monitoring to ensure unprotected personnel are not exposed at or above 30 micrograms of lead per cubic meter of air or 2.5 micrograms of cadmium/chromium per cubic meter of air. If 30 micrograms of lead per cubic meter of air or 2.5 micrograms of cadmium/chromium per cubic meter of air is reached or exceeded, stop

work, correct the conditions(s) causing the increased levels. Notify the Contracting Officer immediately. Determine if condition(s) require any further change in work methods. Resume removal work only after the CP and the Contracting Officer give approval.

e. Before any work begins, a third party consultant must collect and analyze baseline wipe and soil samples in accordance with methods defined by federal, State, and local standards inside and outside of the physical boundary to assess the degree of dust contamination in the facility prior to lead, cadmium and chromium disturbance or removal. Provide Initial Sample Results to the Contracting Officer before work begins.

f. Surface Wipe Samples - Collect surface wipe samples on floors at a location no greater than 10 feet outside the lead, cadmium, chromium control area at a frequency of once per day while lead, cadmium, chromium removal work is conducted in occupied buildings. Surface wipe samples or Micro Vacuum surface sample results must meet criteria in paragraph CLEARANCE CERTIFICATION.

3.4.1.2 Sampling After Removal

After the visual inspection, conduct soil sampling if bare soil is present during external removal operations and collect wipe and soil samples according to the HUD protocol contained in HUD 6780 to determine the lead, cadmium and chromium content of settled dust in micrograms per square meter foot of surface area and parts per million (ppm) for soil.

3.4.1.3 Testing of Material Containing Lead, Cadmium, Chromium Residue

Test residue in accordance with 40 CFR 261 or applicable state or local regulations for hazardous waste.

3.5 CLEANING AND DISPOSAL

3.5.1 Cleanup

Maintain surfaces of the lead, cadmium, chromium control area free of accumulations of dust and debris. Restrict the spread of dust and debris; keep waste from being distributed over the work area. Do not dry sweep or use pressurized air to clean up the area. At the end of each shift and when the lead, cadmium, chromium operation has been completed, clean the controlled area of all visible contamination by vacuuming with a HEPA filtered vacuum cleaner, wet mopping the area and wet wiping the area as indicated by the Lead, Cadmium, Chromium Compliance Plan. Reclean areas showing dust or debris. After visible dust and debris is removed, wet wipe and HEPA vacuum all surfaces in the controlled area. If adjacent areas become contaminated at any time during the work, clean, visually inspect, and then wipe sample all contaminated areas. The CP must then certify in writing that the area has been cleaned of lead, cadmium and chromium contamination before clearance testing.

3.5.1.1 Clearance Certification

The CP must certify in writing that air samples collected outside the lead, cadmium, chromium control area during paint removal operations are less than 30 micrograms of lead per cubic meter of air and less than 2.5 micrograms of cadmium/chromium per cubic meter of air; the respiratory protection used for the employees was adequate; the work procedures were

performed in accordance with 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127; and that there were no visible accumulations of material and dust containing lead, cadmium, chromium left in the work site. Do not remove the lead, cadmium, chromium control area or roped off boundary and warning signs prior to the Contracting Officer's acknowledgement of receipt of the CP certification.

The third party consultant must certify surface wipe sample results collected inside and outside the work area are less than 5 micrograms of lead per square foot on floors, less than 40 micrograms of lead per square foot on interior window sills and less than 100 micrograms of lead per square foot on window troughs not significantly greater than the initial surface loading determined prior to work.

The third party consultant must certify surface wipe sample or Micro Vacuum surface sample results collected inside and outside the work area are less than 200 micrograms of lead per square foot on floors or horizontal surfaces. Use Micro Vacuum technique on rough or porous surfaces which are difficult to achieve clearance by the wipe sampling methodology. Micro Vacuum readings must be calculated by a certified industrial hygienist.

Certify surface wipe samples are not significantly greater than the initial surface loading determined prior to work.

Clear the lead, cadmium, chromium control area in industrial facilities of all visible dust and debris.

For exterior work, soil samples taken at the exterior of the work site must be used to determine if soil lead, cadmium, chromium levels have increased at a statistically significant level (significant at the 95 percent confidence limit) from the soil lead, cadmium, chromium levels prior to the operation. If soil lead, cadmium, chromium levels either show a statistically significant increase above soil lead, cadmium, chromium levels prior to work or soil lead, cadmium, chromium levels above any applicable federal or state standard for lead, cadmium, chromium in soil, the soil must be remediated.

For lead, cadmium and chromium-based paint hazard abatement work, surface wipe and soil sampling must be conducted and clearance determinations made according to the work practice standards presented in 40 CFR 745.227.

3.5.2 Disposal

a. Dispose of material, whether hazardous or non-hazardous in accordance with all laws and provisions and all federal, State or local regulations. Ensure all waste is properly characterized. The result of each waste characterization dictates disposal requirements. Separate hazardous waste from non-hazardous waste to be recycled or reclaimed to the greatest extent practicable in accordance with Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

b. Contractor is responsible for segregation of waste. Collect lead, cadmium, chromium contaminated waste, scrap, debris, bags, containers, equipment, and lead, cadmium, chromium contaminated clothing that may produce airborne concentrations of lead, cadmium, chromium particles. Label the containers in accordance with 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 and 40 CFR 261, 40 CFR 262 and corresponding state regulations.

c. Dispose of lead, cadmium, chromium contaminated material classified as hazardous waste at an EPA or Arkansas State approved hazardous waste treatment, storage, or disposal facility off Government property.

d. Accumulate waste materials in U.S. Department of Transportation (49 CFR 178) compliant container. Properly label each drum to identify the type of hazardous material (49 CFR 172). For hazardous waste, the collection container requires marking/labeling in accordance with 40 CFR 262 and corresponding state regulations during the accumulation/collection timeframe. The Contracting Officer or an authorized representative will assign an area for accumulation of waste containers. Coordinate authorized accumulation volumes and time limits with the host installation environmental function.

e. Handle, store, transport, and dispose lead, cadmium, chromium or lead, cadmium, chromium contaminated waste in accordance with 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, and 40 CFR 265 and 49 CFR 174, and 49 CFR 175, and 49 CFR 176 and state and local regulations. Comply with land disposal restriction notification requirements as required by 40 CFR 268.

f. All lead, cadmium, and chromium waste generation, management, and disposal must be coordinated with the host installation environmental function.

3.5.2.1 Disposal Documentation

Coordinate all disposal or off-site shipments of lead, cadmium, and chromium waste with the host installation environmental function. Submit written evidence of TSD approval to demonstrate the hazardous waste treatment, storage, or disposal facility (TSD) is approved for lead, cadmium, chromium disposal by the EPA, State or local regulatory agencies. Submit one copy of the completed hazardous waste manifest, nonhazardous manifest, or bill of lading, signed and dated by the initial transporter in accordance with 40 CFR 262. Provide a certificate that the waste was accepted by the disposal facility. Provide turn-in documents or weight tickets for non-hazardous waste disposal. Exclude hazardous waste from waste reduction calculations in accordance with Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

3.5.2.2 Payment for Hazardous Waste

Payment for disposal of hazardous and non-hazardous waste will not be made until a signed copy of the manifest from the treatment or disposal facility is received and approved by the Contracting Officer. The manifest must detail and certify the amount of lead, cadmium, chromium containing materials or non-hazardous waste delivered to the treatment or disposal facility.

-- End of Section --

APPENDIX A
BRIDGING DRAWINGS

(Provided as Separate Cover)

APPENDIX B
GEOTECHNICAL REPORT

Geotechnical Exploration and Engineering Report

Pine Bluff Arsenal Access Control Point

Pine Bluff, AR

Prepared By:

HANA
ENGINEERS & CONSULTANTS, LLC

15 December 2025

Revised Final

Hana Project Number: 64707

TABLE OF CONTENTS

1.0 PURPOSE AND SCOPE 4
2.0 PROJECT INFORMATION 4
2.1. Proposed Project Description 4
2.2. Site Description 4
3.0 SUBSURFACE EXPLORATION 5
3.1. Soil Borings 5
3.2. Laboratory Testing 6
4.0 SUBSURFACE CONDITIONS 7
4.1. Regional Geology 7
4.2. Soil Stratigraphy 7
4.3. Groundwater 10
5.0 ENGINEERING EVALUATION AND ANALYSES 10
6.0 DESIGN AND CONSTRUCTION RECOMMENDATIONS 10
6.1. Subgrade Preparation 10
6.2. Structural Fill and Placement 11
6.3. Slab-on-Grade Construction 12
6.4. Shallow Foundations 13
6.5. Pavement Section Design 13
6.6. Seismic Design Variables 14
7.0 LIMITATIONS 14

FIGURES

1. Site Location
2. Boring Location Sketch
3. Boring Location Sketch (Structures)
4. Subsurface Profile Locations

APPENDICES

A: Boring Logs
B: Generalized Subsurface Profiles
C: Laboratory Summary and Plots

Document History

35%	25 Sep 2024	Draft report
Final	23 Oct 2024	Added laboratory results, revised soil stratigraphy tables, updated and revised boring logs and cross sections
Revised Final	15 Dec 2025	Updated project description, added finished floor elevations for the VCC, gate house building and road alignment, updated boring location figures, added frost depth, revised shallow foundation paragraph, added structural fill paragraph

Report Prepared By: Phil Wunderly, P.E. Role: Project Manager

Report Reviewed By: Marcus Kim, P.E. Role: Principal Engineer

1.0 PURPOSE AND SCOPE

This report has been prepared by Hana Engineers and Consultants, LLC (Hana) for the proposed Pine Bluff Arsenal Access Control Point in Pine Bluff, Arkansas. As part of the HANA-KENALL JV (Joint Venture), Hana has been tasked with completing an exploration of the project site's subsurface conditions and providing geotechnical engineering services to support the planning and design of the project. This report includes the results of the subsurface exploration, a geotechnical engineering evaluation, and design and construction considerations.

2.0 PROJECT INFORMATION

2.1. Proposed Project Description

The project consists of the construction of new access control facilities and entry roadway at the Plainview Gate on Hoadley Road at Pine Bluff Arsenal. The proposed facilities include a visitor control center building, several vehicle inspection canopies, a gate house, and guard booths. The project also includes paved areas for processing vehicles for entry, re-aligned access roads, parking areas, and a detention pond in addition to other site infrastructure. Based on drawing sheets provided by Kenall staff, fill amounts over the project area will be up to approximately 7 feet. The finished floor elevation of the visitor control center is 251.6 feet per the drawings (existing elevations range from 243.96 to 246.98 feet). The finished floor of the gate house is 249.0 feet (existing elevations: 243.05 to 244.83 feet). Fill amounts over the access road alignment range from 6.7 feet within the security access area and up to 3 feet over the road alignment from the access area to the tie in on Hoadley Road.

As per communication from the team structural engineer with Kenall, Inc., estimated loads for the proposed structures are as shown in Table 1.

Table 1. Estimated Structural Loads

Proposed Structure	Wall Load, KLF (kips per linear foot)	Column Load, kips
Visitor Control Center	2.6	26
Gate House	1.65	3
Canopies	n/a	24

2.2. Site Description

The project is located along the south side of Hoadley Road, approximately 2 miles northeast of the intersection of Hoadley Road and Interstate Highway 530 in Pine Bluff, Arkansas (a site location sketch is shown in Figure 1). The project site generally covers about 16 acres of primarily wooded area south of the existing Hoadley Road. Portions of asphalt and concrete pavement exist in the southwest corner of the site. Additional site infrastructure present includes fencing, underground utilities, light poles, and overhead power lines.

3.0 SUBSURFACE EXPLORATION

3.1. Soil Borings

The subsurface exploration was completed at the project site from 26 August to 5 September 2024 and consisted of thirty-seven (37) Standard Penetration Test (STP) borings. The borings designated as S-1 and S-3 through S-6 were completed within the general footprint of the proposed visitor control center and were drilled to depths of 35 feet below the existing ground surface (*NOTE: boring B-2 was removed from the scope of work prior to start of field work*). Boring S-7 was completed at the location of the search area canopy and S-8 was completed at the location of the gatehouse. The borings designated as P-1 through P-27 were completed along the approximate alignment of the proposed access roads and across the pavement portions of the access control facility within the project site to depths of approximately 10 feet. Borings D-1, D-2 and D-3 were completed at the proposed location of the detention pond and were terminated at the depth of 10 feet to 20.5 feet.

Note: Boring locations were chosen based on the preliminary site layout at the time. The finalized layout has shifted from that time and as such, some borings are located just outside of structure and roadway footprints.

Terracon (Little Rock, AR office) performed the SPT borings. Boring locations were located by Terracon personnel based on information provided by Hana engineers. Approximate boring locations are shown on the attached boring location sketch (Figures 2) which were created from drawings provided by Kenall, Inc.

The SPT borings were performed with the use of hollow stem auger drilling procedures in general accordance with ASTM D 1586. The tests were performed from the existing ground surface to approximate depths of 10 to 12 feet and at 5-foot intervals thereafter. Soil samples were obtained with a standard 1.4-inch inner diameter, 2-inch outer diameter, 30-inch-long split-spoon sampler. The sampler was driven with blows of a 140 lb. automatic hammer falling 30 inches. The number of blows required to drive the sampler each 6-inch increment of penetration was recorded and is shown on the boring logs. The sum of the second and third penetration increments is termed the SPT N-value (measured in blows per foot and uncorrected for automatic hammer and overburden pressure). A representative portion of each disturbed split-spoon sample was collected, placed in a glass jar, sealed, labeled, and returned to the Terracon office for review.

Several “undisturbed” soil samples of fine-grained soils were collected in accordance with ASTM D 1587 using 3-inch Shelby Tube (thin-walled) samplers at select depths and locations as noted on the attached boring logs.

Four (4) composite bulk soil samples, consisting of boring cuttings within 5 feet of the ground surface, were collected from the following boring locations:

Table 2. Bulk Soil Sample Collection

Bulk Sample No.	Boring Locations
1	P-7, P-8, P-12, P-13, P-14, and P-15
2	P-6, P-10, P-11, and P-17
3	P-18, P-19, P-20, P-21, P-22, and P-23
4	S-1 through S-8

3.2. Laboratory Testing

Select soil samples (undisturbed and disturbed) obtained from the SPT borings were returned to the Terracon (Little Rock) laboratory and were tested for the following: natural moisture content (ASTM D 2216), Atterberg limits (ASTM D 4318), percent finer than no. 200 sieve, (ASTM D 1140), consolidation (ASTM D 2435), and unconsolidated-undrained triaxial compression (ASTM D 2850).

The bulk sample obtained from borings S-1 through S-8 (bulk sample no. 4) was tested at the Terracon (Midland, TX office) laboratory for pH, water soluble sulfates, sulfides, chlorides, oxidation/reduction potential, total salts, and resistivity. Results are summarized in Table 3 below.

Table 3. Soil Analytical Results

pH	Water Soluble Sulfate, mg/kg	Sulfides, mg/kg	Chlorides, mg/kg	Oxidation/ Reduction Potential (mV)	Total Salts, mg/kg	Resistivity (ohm-cm)
7.3	18	Not detected	69	+532	670	2,581

Comparison of the results to the AWWA (American Water Works Association) C-105 10-Point Test and to DIPRA (Ductile Iron Pipe Research Association) standards indicates that the soils would not be considered corrosive to ductile iron pipe.

The bulk samples obtained from the pavement borings (bulk samples 1 through 3) were tested for California Bearing Ratio (“CBR”, ASTM D 1883) and Moisture-Density relationship (Standard Proctor, ASTM D 698). Results of the testing is summarized in Table 4. Laboratory plots can be found in Appendix C.

Table 4. CBR Results

Bulk Sample	USCS(1)	% Passing #200 Sieve	Atterberg Limits, LL/PL/PI	Max. Dry Density, pcf	Optimum Moisture, %	CBR Value	Swell, %
1	CL	81	27/16/11	115.5	13.1	3.3	0.3
2	CL	83	28/15/13	113.0	14.0	4.0	0.3
3	CL	73	23/15/8	116.9	12.0	5.2	0.2

(1) USCS: Unified Soil Classification System

Two one-dimensional consolidation tests were performed on the undisturbed samples obtained from borings S-7 and S-8. Results are summarized in the following table and laboratory plots can be found in Appendix C.

Table 5. Consolidation Testing Results

Sample (Boring)	Depth, ft	USCS[1]	Initial Void Ratio, e_0	Natural Moisture, %	Atterberg Limits, LL/PL/PI	C_c[2]	C_r[3]	P_c[4], psf
ST-1 (S-7)	18	ML	0.514	15	18 / 17 / 1	0.123	0.018	7,800
ST-1 (S-8)	13	CL	0.499	14	21 / 13 / 8	0.090	0.011	8,400

(1) USCS: Unified Soil Classification System
(2) C_c: Compression Index
(3) C_r: Recompression Index
(4) P_c: Preconsolidation Pressure

A triaxial unconsolidated, undrained (UU) stress test (ASTM D 2850) was performed on the undisturbed sample obtained from a depth of 13 to 15 feet below the ground surface at boring S-6 (see Appendix C for laboratory plot). The shear strength of the sample was determined to be 1.86 tsf (at a confining pressure of 1,650 psf).

4.0 SUBSURFACE CONDITIONS

4.1. Regional Geology

The project area is located along the southern portion of the state of Arkansas in the western Gulf Coastal Plain physiographic region. This region consists of relatively flat to gently rolling terrain, with broad floodplains and extensive wetlands. The geology of the area is dominated by unconsolidated sediments, including sand, silt, clay, and gravel, which have been deposited by rivers over time. The region does not typically exhibit karst topography due to the lack of soluble rock formations like dolomite and limestone.

The primary geologic formation at the project location is the Wilcox Group Formation. This formation consists of thick beds of tan to light brown, fine-grained sand and clay with lesser amounts of silt and lignite.

4.2. Soil Stratigraphy

A general description of each soil stratum encountered at the project site during our exploration is provided in the following tables. Generalized subsurface profiles can be found in Appendix B.

Table 6. Subsurface Soil Conditions, Structure (S) borings

Stratum	Avg. Depth ft, bgs[1]	Description	Ranges of SPT N values, bpf[2]
Topsoil	0 to 0.3	3 to 4 inches of topsoil	-
I	0.3 to 4.5 - 23.5	CLAY (CL) with varying amounts of sand	12 to 50+
II	4.5 - 23 to 23 - 28.5	Silty, clayey SAND (SP-SM, SM, SC) and SILT (ML) *This stratum was not encountered in boring S-5*	5 to 50+
III	23 - 28.5 to 35	CLAY (CL and CH) with varying amounts of sand *Borings S-1 through S-8 were terminated in this stratum*	9 to 22

(1) below ground surface
(2) blows per foot

Table 7. Subsurface Soil Conditions, Pavement (P) Borings

Stratum	Avg. Depth ft, bgs[1]	Description	Ranges of SPT N values, bpf[2]
Topsoil	0 to 1	1 to 12 inches of topsoil *Not encountered in borings P-14, and D-1 to D-3 or borings in existing pavement areas (see Table 9 for additional information)*	-
Pavement	1 to 1.5	Asphalt and Concrete over varying amounts of aggregate *(see Table 9 for additional information)*	-
Fill	0.7 to 3	Clay (CL) and SILT (ML) with varying amounts of sand and gravel *Only encountered in borings P-1, P-3, P-4 and P-25 to P-27 (see Table 9 for additional information)*	4 to 17
I	0 - 3 to 7 - 10	Lean CLAY (CL) with varying amounts of sand, isolated deposits of fat CLAY (CH) were encountered in boring P-22. *This stratum was not encountered in borings P-18, P-21, and P-27* *Borings P-1 through P-9, P-11, P-12, P-14 through P-16. P-17, P-22, and P-24 through P-26 were terminated in this stratum*	4 to 50+
II	7 to 10	SAND (SM, SC) and SILT (ML)with varying amounts of gravel. *Only encountered in borings P-10, P-13, P-16, P-18 to P-21, P-23, and P-27 which were all terminated in this stratum*	31 to 50+

(1) below ground surface
(2) blows per foot

Table 8. Subsurface Soil Conditions, Detention Pond (D) Borings

Stratum	Avg. Depth ft, bgs[1]	Description	Ranges of SPT N values, bpf[2]
IA	0 to 10	Silty SAND (SM) *Boring D-1 was terminated in this stratum*	22 to 50+
IB	0 - 2 to 11	CLAY (CL) with varying amounts of sand *Isolated layer of Clayey SAND (SC) was encountered in boring D-2 (5 to 8 feet)*	13 to 50+
II	8 - 11.5 to 20.5	Silty SAND (SM) *Boring D-2 and D-3 were terminated in this stratum*	10 to 27

(1) below ground surface
(2) blows per foot

The soil strata discussed herein, and the profiles included in the appendix represent an interpretation of the field exploration data using generally accepted geotechnical engineering practices. As the transition between soil types may occur gradually and between collected soil samples, the lines delineating strata on the boring logs, profiles, and delineations described in the following subsections represent approximate boundaries between soil types. The general descriptions above should not be considered as a substitute for the field exploration logs that are provided in Appendix A.

"Topsoil" used herein refers to soil containing organic matter and does not indicate any adherence to project specifications or standards; it is recommended that this material be tested if considered for re-use.

As previously mentioned, several pavement borings were completed in areas of existing pavement. Locations, borings, and pavement composition are summarized in the following table (Table 9.)

Table 9. Summary of Encountered Existing Pavement Conditions

Location	Boring	Asphalt Thickness, inch	Concrete Thickness, inch	Aggregate Thickness, inch
Roadway East of Plainview Gate	P-1	6	11	*Not encountered*
	P-3	12	*Not encountered*	*Not encountered*
	P-4	6	*Not encountered*	*Not encountered*
Abandoned paved area South of Hoadley Rd.	P-7	< 1	*Not encountered*	*Not encountered*
	P-8	< 1	*Not encountered*	*Not encountered*
	P-9	< 1	*Not encountered*	2
	P-12	1.5	*Not encountered*	3
Roadway East of Seibert Rd.	P-25	8	*Not encountered*	*Not encountered*
	P-26	8	*Not encountered*	*Not encountered*
	P-27	9	*Not encountered*	*Not encountered*

4.3. Groundwater

The groundwater level was recorded at boring location D-2 at a depth of 11 feet below existing site grades after drilling. Groundwater was not encountered in any other boring. Based on the observations during drilling and as observed through the relative wetness of the recovered soil samples during the drilling operations, the groundwater table, at the end of drilling, was generally determined to occur at a depth of 10 to 11 feet below existing site grades.

We note that the clayey soils observed at the project site can cause perched groundwater conditions that results in groundwater being found close to the ground surface. Perched groundwater can occur when surface and/or subsurface water is prevented from infiltrating into deeper subsurface soils due to the impermeable nature of overlying clayey soils.

The depth of groundwater, especially perched groundwater, is expected to fluctuate with seasonal variations of rainfall. The groundwater information presented in this report may not reflect the project site's year-long groundwater conditions. As such we recommend that the contractor determine the actual groundwater levels at the time of the construction to ascertain any impact to their activities.

5.0 ENGINEERING EVALUATION AND ANALYSES

Bearing capacity was evaluated in general accordance with *USACE EM 1110-1-1905 Bearing Capacity of Soils* using both the original Terzaghi's equation and factors and the Hansen (1970) equation and factors.

Settlement was evaluated using one-dimensional consolidation theory in general accordance with *USACE EM 1110-1-1904 Settlement Analysis.*

6.0 DESIGN AND CONSTRUCTION RECOMMENDATIONS

6.1. Subgrade Preparation

Preparation of subgrades should include the removal of existing "topsoil", cleared soils, previously placed fill material, asphalt, concrete and other unsuitable materials (near surface debris and organic or wet soils). Based on measurements made during the subsurface exploration, approximately 1 to 12 inches of topsoil, were observed at the boring locations (topsoil was not observed at borings P-1, P-3, P-4, P-7 through P-9, P-12, P-14 and D-1 through D-3).

As portions of the site were observed to have been previously developed (based on the presence of the abandoned pavement area), buried debris or materials, though not encountered in the borings, may be present in that area. We recommend that the contractor have all utilities located within the proposed construction areas prior to the start of construction.

Site drainage should continuously be managed during construction. All surface water should be prevented from getting trapped/perched in between soil layers, structures, etc. Construction difficulties resulting from the presence of near surface groundwater or excess soil moisture will be much less likely to occur if work is conducted during periods of less precipitation.

The near surface subgrade soils, when exposed after clearing, are moisture sensitive and will lose stability if they become wet and/or are subjected to excessive construction traffic. Therefore, site preparation should be performed during an extended period of dry weather and construction traffic should be limited when in the footprint of the proposed structures and paved areas once the subgrade has been **properly prepared** (as discussed in the first paragraph of this section).

Undercutting or reworking of the near surface soils may be necessary if the exposed subgrade soils become unstable during construction. Once approved (see following paragraph), any fill, aggregates, and/or concrete should be placed as soon as possible over the subgrade to reduce exposure of the subgrade to weather and construction activity.

Subgrades (pavement, structure and areas to receive fill) should be observed, evaluated, and approved for suitability by a geotechnical engineer once the initial subgrade preparation has taken place. A proof-roll of the subgrade by a fully loaded dump truck or 10-ton roller with vibration turned off shall be performed. In the case of concrete placement, the subgrade should be evaluated prior to placement of any reinforcement steel and for pavement areas, prior to placement of aggregate layers. At the time of evaluation and prior to placement of fill, aggregate, reinforcing steel and concrete, the subgrade should be free of soft, wet (visible free water, soil moisture remains on hands after being handled), or unsuitable soils. Unsuitable soils include organic material, wet subgrade soils, pumping/rutting subgrade soils (under the weight of proof-roll by a fully loaded dump truck or 10-ton roller with vibration turned off), and/or debris (man-made or naturally occurring) larger than 3 inches in size. The need for, and extent of, undercutting should be based on field observations made by a geotechnical engineer or their representative at the time of construction. Any over excavation should be backfilled with an approved compacted backfill material to the planned footing or pad bearing level or road subgrade level.

Approved structural fill/backfill material should be non-expansive and free of organic matter, debris, and particles larger than 3 inches in size. Proposed materials should be subjected to laboratory tests consisting of, but not necessarily limited to, moisture density determinations, Atterberg limits, and sieve analyses. Approved structural fill/backfill should classify per the Unified Soil Classification System (USCS) as SW, SP, SP-SM, SM, GP or GW with a maximum of 20 percent fines passing the No. 200 sieve. The fill/backfill should be placed in loose lifts not exceeding 12 inches in thickness and compacted using a 10-ton static drum weight vibratory compactor. Each lift should be compacted to a minimum of 98% of the material's maximum dry density and within 2 percentage points of the optimum moisture content as determined in accordance with ASTM D 1557 (Modified Effort Proctor Test). When using plate compactors or tampers ("jumping jack" style) in utility trenches or excavations, fill shall be placed 6 to 8 inch lifts.

The predominant soil component within the near surface at the project site is CLAY (CL) with varying amounts of sand and silt. The shallow subsurface CLAY (CL) soils encountered at the boring locations do not appear to meet the criteria recommended in this report for reuse as on-site borrow fill. These soils, however, may be used as general fill in landscaped or green areas. We note that highly plastic, moisture sensitive, fine-grained soil (CH clay or MH silt) shall not be used for any construction activities (including but not limited to, backfilling utility trenches, raising grades for building or pavement areas, and/or backfilling against below-grade utility structures).

6.2. Structural Fill and Placement

Following the approval of the subgrade soils by a geotechnical engineer or their representative, the placement of structural fill to establish final site grades may begin. Any material to be used for Structural Fill should be evaluated and tested prior to placement to determine if it is suitable for the intended use. Fill materials to replace undercut areas and to achieve finish grades shall consist of structural fill or on-site borrow meeting the following requirements:

On-Site Borrow Fill: Soil material which is free of organics and debris classified as SC, SM, SP, GM, GC, GP, or better containing less than 50% passing the No. 200 sieve (Silt or Clay) and

having a maximum Liquid Limit of 30 and Plasticity Index of 15. Maximum aggregate size should be limited to 3 inches. Drying or wetting of these materials may be necessary to achieve optimal moistures required for proper compaction. Those soils with high amounts of fines (generally >25% silt and clay) are moisture sensitive and difficult to compact when wet.

Imported Structural Fill: Soil material imported from local sources for use in general construction should consist of a material classified as SM, SP, GM, GC, GP, or better containing a maximum 20% passing the No. 200 sieve (Silt or Clay) and having a maximum Liquid Limit of 20 and Plasticity Index of 6 and free of rubble, organics, clay, debris, and other unsuitable material. Maximum aggregate size should be limited to 3 inches.

All Structural Fill or Borrow Fill placed in structural areas (building pads, pavements, canopy slabs etc.) should be compacted to a dry density of at least 98% of the Modified Proctor maximum dry density, in accordance with ASTM D 1557. The moisture content of the structural fill should be within ±2 percentage points of the optimum moisture content at the time of placement.

In general, the compaction should be accomplished by placing the fill in lifts not exceeding 12 inches and mechanically compacting each lift to at least the specified minimum dry density. Backfill material in utility trenches within the construction areas should consist of Structural Fill or Borrow Fill (as previously described) and should be compacted to at least 98% of the Modified Proctor maximum dry density, in accordance with ASTM D 1557. This fill should be placed in 4 to 6 inch loose lifts when hand compaction equipment is used. Hand operated compaction equipment shall be used along utility pipes to ensure that the material beneath and up to the pipe center are properly compacted.

Care should be used when operating compaction equipment near existing structures to avoid transmission of the vibrations that could cause settlement damage or disturb occupants. In this regard, it is recommended that vibratory rollers remain at least 25 feet away from existing structures; these areas should be compacted with small, hand-operated compaction equipment.

Portions of the project site will require up to 7 feet of fill to establish finish grades per the drawings provided by Kenall, Inc. Settlement magnitudes associated with the placement of this fill within the footprint of project structures (visitor control center and gatehouse) is expected to be up to 1 inch and will occur during construction.

6.3. Slab-on-Grade Construction

Floor slabs may be constructed as slab-on-grade members provided the previously recommended “6.1 Subgrade Preparation” activities and evaluations are properly accomplished. It is recommended that ground-supported slabs be directly supported by a Porous Fill layer. The Porous Fill can consist of at least 6 inches of relatively clean, compacted, SP or GP material with less than 5% passing the No. 200 Sieve (0.074 mm). ASTM C 33 Concrete Sand and State Department of Transportation No. 57 Stone are considered suitable for this purpose. The purposes of the Porous Fill layer are to serve as a capillary barrier and to provide more uniform slab support.

A standard modulus of subgrade reaction (“k”) range of 150 to 200 pci may be used for the design of the slabs.

6.4. Shallow Foundations

Based on our analysis of the estimated total loads provided by the team structural engineer, the proposed structures can be supported on shallow foundations using an allowable bearing capacity of 3,000 psf provided the previously recommended “Subgrade Preparation” activities and evaluations are properly accomplished. Settlement magnitudes, based on the minimum footing widths discussed below (24 inches for strip footings and 36 inches for column footings) and the consolidation testing results, are estimated to be less than 1 inch provided the preparation and construction procedures provided herein are properly performed. Equipment pad foundations may consist of slabs with turned down edges.

CLAY (CL) soils will be encountered at the bearing level of footings or turned down edges and may present a potential for volume change because of moisture variation (shrink-swell). To minimize moisture changes and any shrink-swell effects, footings and turned down edges should bear at a minimum depth of 24 inches below the finished site grades.

Strip footings should have a minimum width of 24 inches, and column footings a minimum width of 36 inches, to reduce the potential for ‘punching’ shear failure. Structural elements should be centered on the footing to provide uniform load distribution unless the footings are proportioned and evaluated for eccentric loading.

The base (bottom) subgrade of foundation excavations should be observed, evaluated, and verified for the design bearing pressure by a geotechnical engineer after the excavation has reached the appropriate depth and prior to reinforcement steel placement. If soft, unsuitable soils, or deleterious materials (manmade debris, large roots, organic materials, etc.) are encountered during foundation construction, localized undercutting of foundation subgrades will be required. These unsuitable soils include wet subgrade soils, pumping/rutting subgrade soils under the weight of proof-roll truck, and/or any debris larger than 3 inches in size. The need for, and extent of, undercutting should be based on field observations made by a geotechnical engineer at the time of construction. Any over-excavation under the proposed footings should be backfilled with an approved backfill material or lean concrete to the planned foundation bearing level.

Excavations for foundations should be made in such a way to provide bearing surfaces that are firm and free of loose, soft, wet, or otherwise disturbed soils. Foundation concrete should not be placed on frozen or saturated subgrades. If such materials are allowed to remain below foundations, settlements will increase. Concrete should be placed as soon as practical after the foundations are excavated. If an excavation is left open for an extended period, a thin mat of lean concrete should be placed over the bottom to minimize damage to the bearing surface from weather or construction activities. Water should not be allowed to pond in any excavation.

Frost depth for the region where the project site is located can be considered as 12 inches.

6.5. Pavement Section Design

Per the 2018 Access Control Point Study provided by Kenall and completed by Gannett Fleming, 24-hour traffic counts conducted over a two day period in February 2018 at the Plainview Gate on Hoadley Road indicated inbound and outbound volumes of approximately 700 vehicles, respectively, for a total volume of 1,400 vehicles.

Assuming a pavement life span of 25 years, a daily traffic volume of 1,500 vehicles (split evenly between passenger cars, small pickup/SUV trucks, and large pickup/SUV trucks), the total lifetime passes by the controlling vehicle, the large SUV/truck, was calculated to be 3,125,000 (500 passes per day, 250 weekdays per year over 25 years).

Based on these assumptions and a cohesive subgrade with a CBR of 4, a flexible pavement section for the realigned roadway and the visitor processing area was determined using PCASE 7.0.6 software (Pavement-Transport Computer Assisted Structural Engineering software as developed by the U.S. Army Corps of Engineers). The resulting pavement section is as follows:

- 4 inches of asphalt
- 8 inches of aggregate base course
- In-situ soil or structural fill subgrade with minimum CBR of 4.

As previously noted, the near surface subgrade soils are moisture sensitive and when exposed they will lose stability if they become wet and/or are subjected to excessive construction traffic. As such, pavement subgrade preparation should be performed during an extended period of dry weather and construction traffic should be limited when in the footprint of the proposed paved areas once the subgrade has been properly prepared (see Section 6.1).

Methods to address unstable subgrade soils include the following: reworking the near surface soils to allow for drying, removal and replacement with structural fill, placement of a geotextile fabric separation layer, or treatment with chemical additives (e.g. lime). Based on the results of the laboratory testing, the near surface CLAY (CL) soils encountered within pavement areas meet the recommended guidelines for application of lime per UFC (Unified Facilities Criteria) 3-250-11 *Soil Stabilization and Modification for Pavements* (PI > 12 and more than 25% passing the #200 sieve).

6.6. Seismic Design Variables

Based on the recovered soils (to a maximum depth of 35 feet), it is our opinion that the site may be classified as Site Class “D” in accordance with Table 20.3-1 of ASCE 7-22 as referenced by the 2021 International Building Code (IBC). We note that the seismic evaluation (per the aforementioned standard) requires soils information within the upper 100 feet of the site. If the site classification is critical to the structural design, it will be necessary to obtain soil and rock information within that depth or to perform shear wave velocity testing at the site.

The web based ASCE Seismic Hazard Tool indicates the following seismic site characteristics:

Latitude..... 34.301339°
Longitude..... -92.086139°

Max. Considered Earthquake Ground Motion, 0.2 sec. Spectral Response, S_s..... 0.47g
Max. Considered Earthquake Ground Motion, 0.1 sec. Spectral Response, S_1 ..... 0.16g

Design Spectral Response Acceleration, S_{DS} 0.35g
Design Spectral Response Acceleration, S_{D1}..... 0.22g

7.0 LIMITATIONS

This report was prepared for the exclusive use of the HANA-KENALL JV specifically for the Pine Bluff Arsenal Access Control Point Project. The analyses and recommendations contained in this report are based on data obtained from our subsurface explorations and laboratory tests conducted for this study. These explorations indicate subsurface conditions only at specific locations and times, and only to the depths penetrated. Variations may exist and conditions not observed or described in this report could be encountered during construction. Our conclusions and recommendations are based on our analysis of the conditions observed. If conditions other than those described in this report are encountered, we should be notified so that we can provide additional recommendations, if warranted.

In the event there are any changes in the ownership, nature, design, or location of the proposed project, or if any future additions are planned, our conclusions and recommendations included in this report should not be considered valid unless 1) the project changes are reviewed by Hana, and 2) conclusions and recommendations presented in this report are modified or verified in writing.

In performing our professional services, we have used generally accepted geologic and geotechnical engineering principles and have applied that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical engineers currently practicing in this or similar localities. No other warranty, express or implied, is made as to the professional advice included in this document. No information presented in this report shall be independently used outside of the context and limitations described in the report. Hana shall not be held responsible for use of the information presented herein outside of the context of this report.

FIGURES

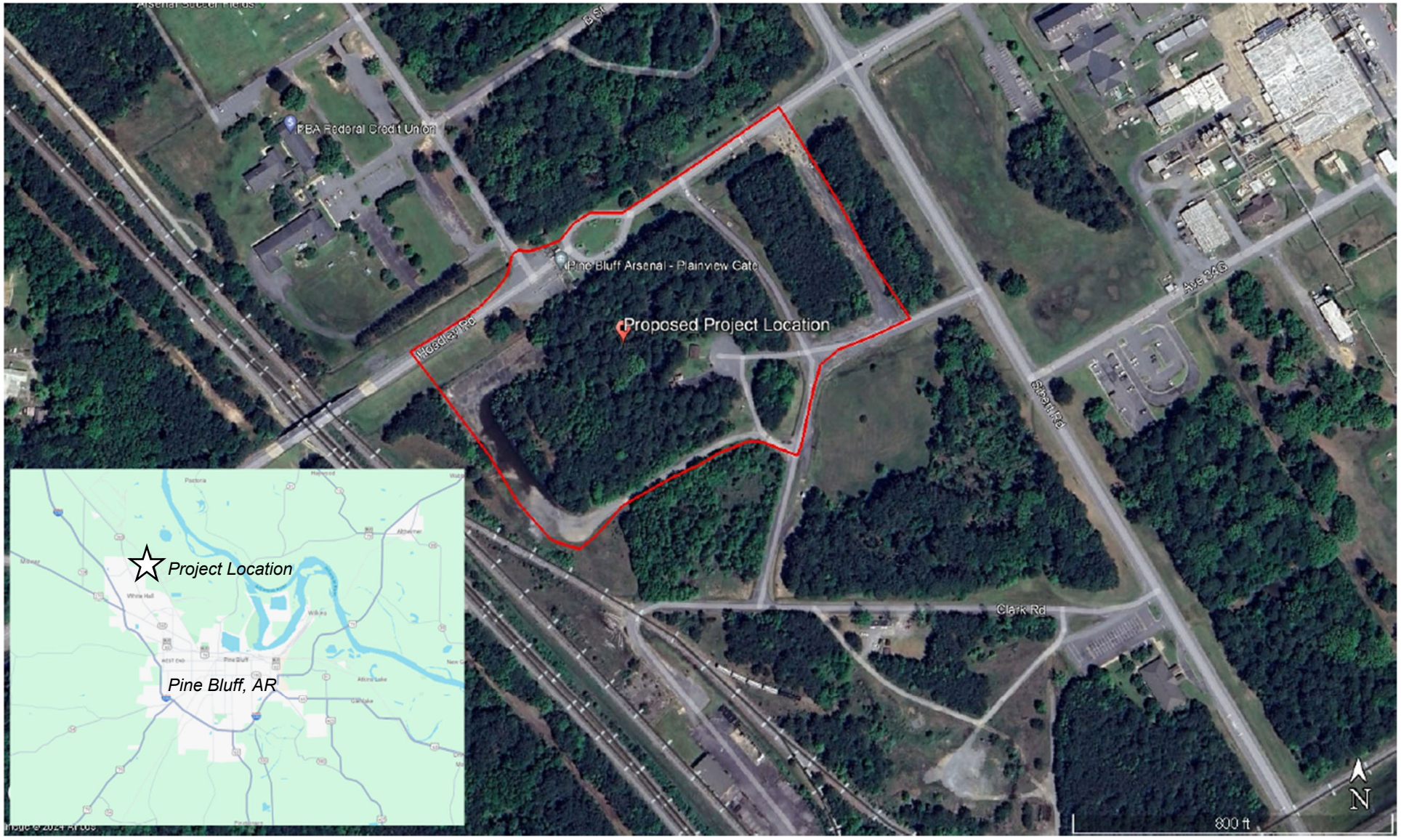


FIGURE 1. Site Location (*Images obtained from Google Maps and Google Earth Pro*)

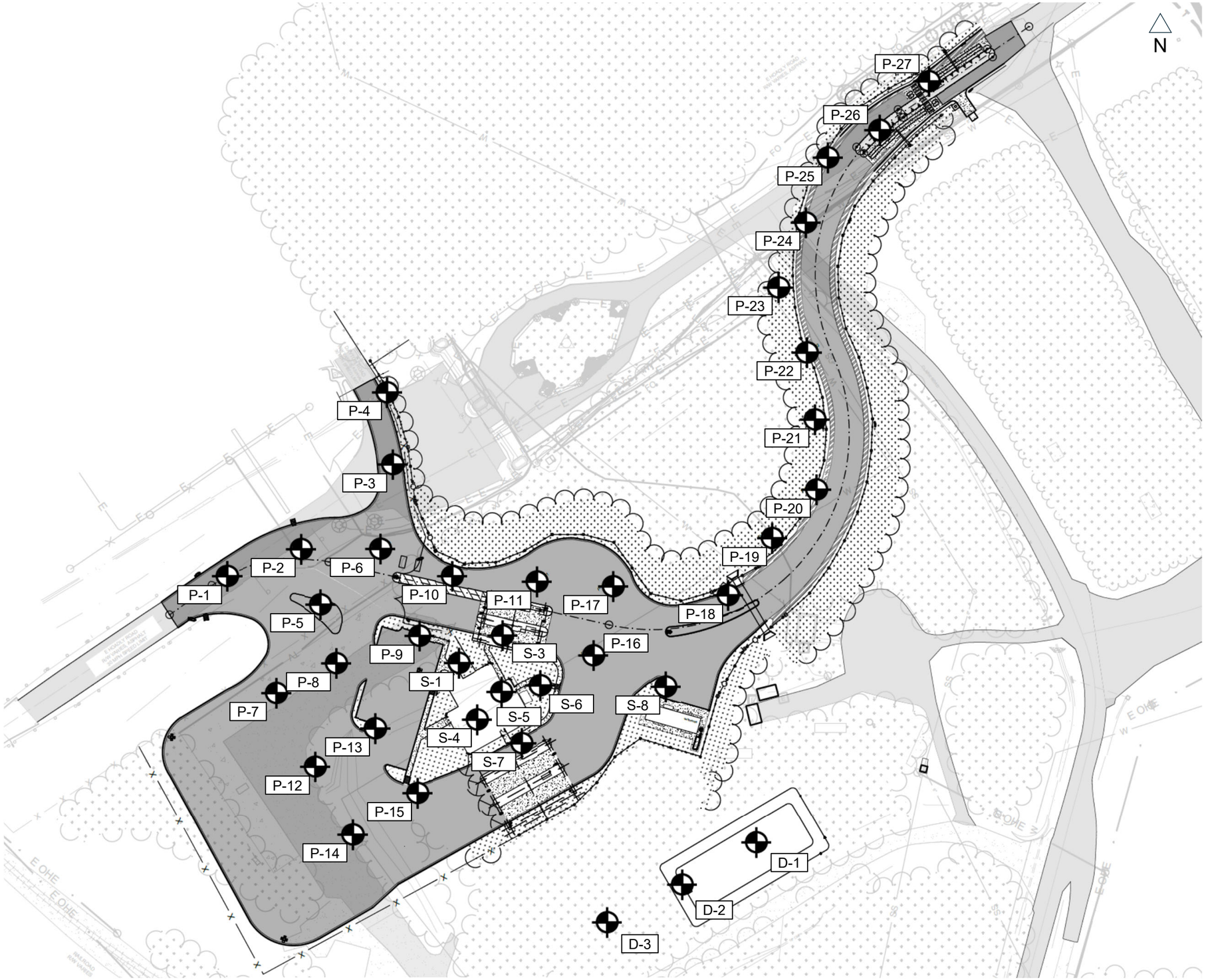


FIGURE 2. Approximate Boring Locations (not to scale).

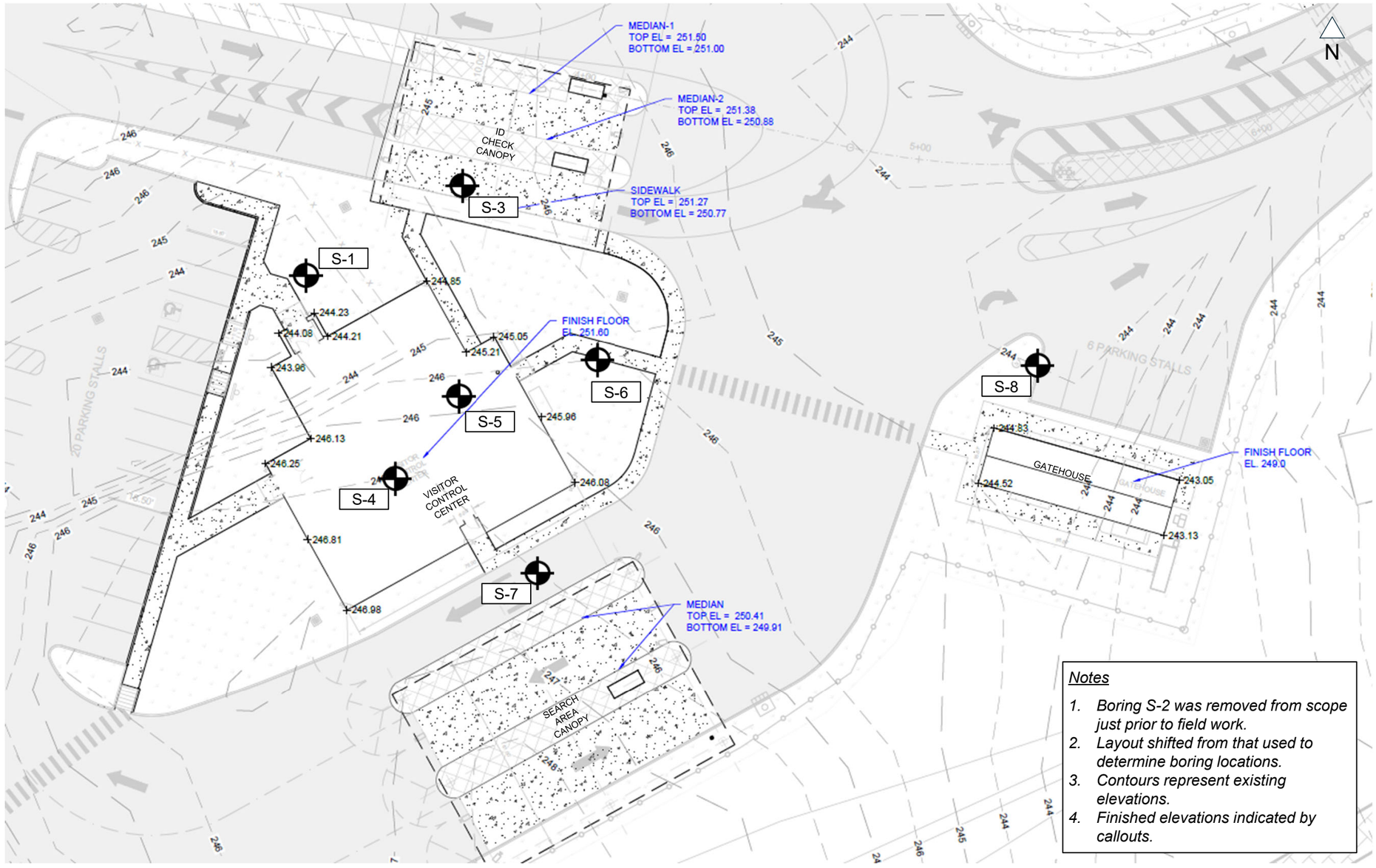


FIGURE 3. Approximate Structure Boring Locations (not to scale).

FIGURE 3. Subsurface Profile Locations (not to scale).

APPENDIX A: BORING LOGS

DRILLING LOG

DIVISION: Southwestern
INSTALLATION: N/A
Sheet 1 of 2

1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County
10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet
VERTICAL: NAVD88
LOCATION COORDINATES: N: 1907329.21 E: 1286450.05
LOCATION METHOD:
2. HOLE NUMBER: S-1
3. DRILLING AGENCY: Terracon
11. DATE BORING: STARTED Aug 28 2024; COMPLETED Aug 28 2024
4. NAME OF DRILLER: Dakota Sloan
12. HAMMER TYPE: Automatic
EFFICIENCY (%):
5. EQUIPMENT: CME 55 Drill Rig 546
13. SIZE AND TYPE OF BIT: 3.75" HSA
6. DIRECTION OF BORING: Vertical; DEG FROM VERTICAL: 0; BEARING:
14. ELEVATION SURFACE: 243.4'
15. ELEVATION GROUND WATER:
7. THICKNESS OF OVERBURDEN: 35.0'
16. TOTAL NUMBER CORE BOXES:
8. DEPTH DRILLED INTO ROCK:
17. SIGNATURE AND TITLE OF INSPECTOR: JB
9. TOTAL DEPTH OF BORING: 35.0'

ELEV	DEPTH	BLOWS/0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
~~243.11~~	~~0.30~~				Topsoil, 3 inches										
		4 5 7	12		LEAN CLAY WITH SAND (CL) light gray and light brown, stiff to hard		S-1						23		
		14 18 30	48				S-2								
238.91	4.50						ST-1								
		7 14 22	36		SANDY SILT (ML) light gray and light brown, hard		S-3			57	NP	NP	13		239
237.41	6.00	18 20 22	42		POORLY GRADED SAND WITH SILT (SP-SM) light gray and light brown, loose to dense		S-4								
		4 7 10	17				S-5								
		4 2 3	5				S-6								234
					clay seam at about 10 feet										
		12 15 18	33				S-7			10	NP	NP	10		229
		8 9 11	20				S-8								224
219.91	23.50														
		7 8 10	18		LEAN CLAY (CL) gray and reddish brown, stiff to very stiff		S-9								219
		4 4 5	9				S-10								214

(continued on next page)

DRILLING LOG (Cont Sheet)

INSTALLATION: N/A

Sheet 2 of 2

PROJECT: Pine Bluff Arsenal Access Control Point
Jefferson County

COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet

VERTICAL: NAVD88

LOCATION COORDINATES: N: 1907329.21 E: 1286450.05

LOCATION METHOD:

ELEV	DEPTH	BLOWS/ 0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
					LEAN CLAY (CL) gray and reddish brown, stiff to very stiff										
208.41	35.00	5 7 9	16				S-11								
					Borehole finished at 35.0										

209
204
199
194
189
184
179

DRILLING LOG

DIVISION: Southwestern
INSTALLATION: N/A
Sheet 1 of 2

1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County
10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet
VERTICAL: NAVD88
LOCATION COORDINATES: N: 1907358.72 E: 1286483.95
LOCATION METHOD:
2. HOLE NUMBER: S-3
3. DRILLING AGENCY: Terracon
11. DATE BORING: STARTED Aug 28 2024; COMPLETED Aug 28 2024
4. NAME OF DRILLER: Dakota Sloan
12. HAMMER TYPE: Automatic
EFFICIENCY (%):
5. EQUIPMENT: CME 55 Drill Rig 546
13. SIZE AND TYPE OF BIT: 3.75" HSA
6. DIRECTION OF BORING: Vertical; DEG FROM VERTICAL: 0; BEARING:
14. ELEVATION SURFACE: 246.0'
15. ELEVATION GROUND WATER:
7. THICKNESS OF OVERBURDEN: 35.0'
16. TOTAL NUMBER CORE BOXES:
8. DEPTH DRILLED INTO ROCK:
17. SIGNATURE AND TITLE OF INSPECTOR: JB
9. TOTAL DEPTH OF BORING: 35.0'

ELEV	DEPTH	BLOWS/0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
245.68	0.30				Topsoil, Cleared Soils (disturbed), 4 inches										
		15			LEAN CLAY WITH SAND (CL) light gray, hard to very hard										
		20	47				S-1				28	13			
		27													
		24													
		20	40				S-2								
		20													
		18													
		20	41				S-3								
		21													
		22													
		30	60				S-4								
239.48	6.50	30													
		25			POORLY GRADED SAND WITH SILT (SP-SM) light gray and										
		26	56		light brown, medium dense to very dense, with clay seams		S-5								
		30													
		22													
		25													
		25	50				S-6				NP	NP	6		
		26													
		10													
		10	25				S-7								
		15													
		6													
		8	16				S-8								
		8													
222.98	23.00				LEAN CLAY WITH SAND (CL) gray and light brown, stiff		ST-1								
		4													
		4	10				S-9				39	23	23		
		6													

(continued on next page)

DRILLING LOG (Cont Sheet)

INSTALLATION: N/A

PROJECT: Pine Bluff Arsenal Access Control Point
Jefferson County

COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet

VERTICAL: NAVD88

LOCATION COORDINATES: N: 1907358.72 E: 1286483.95

LOCATION METHOD:

ELEV	DEPTH	BLOWS/ 0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
212.48	33.50				LEAN CLAY WITH SAND (CL) gray and light brown, stiff										
210.98	35.00	6 7 8	15		SANDY LEAN CLAY (CL) light gray and reddish brown, stiff to very stiff		S-10								
					Borehole finished at 35.0										

211
206
201
196
191
186
181

DRILLING LOG

DIVISION: Southwestern
INSTALLATION: N/A
Sheet 1 of 2

1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County
10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet
VERTICAL: NAVD88
LOCATION COORDINATES: N: 1907263.94 E: 1286488.19
LOCATION METHOD:
2. HOLE NUMBER: S-4
3. DRILLING AGENCY: Terracon
11. DATE BORING: STARTED Aug 29 2024; COMPLETED Aug 29 2024
4. NAME OF DRILLER: Dakota Sloan
12. HAMMER TYPE: Automatic
EFFICIENCY (%)
5. EQUIPMENT: CME 55 Drill Rig 546
13. SIZE AND TYPE OF BIT: 3.75" HSA
6. DIRECTION OF BORING: Vertical; DEG FROM VERTICAL: 0; BEARING:
14. ELEVATION SURFACE: 246.5'
15. ELEVATION GROUND WATER:
7. THICKNESS OF OVERBURDEN: 35.0'
16. TOTAL NUMBER CORE BOXES:
8. DEPTH DRILLED INTO ROCK:
17. SIGNATURE AND TITLE OF INSPECTOR: JB
9. TOTAL DEPTH OF BORING: 35.0'

ELEV	DEPTH	BLOWS/0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
246.23	0.30				Topsoil, Cleared Soils (disturbed), 4 inches										
		12 16 16	32		SANDY LEAN CLAY (CL) light brown and light gray, very stiff to very hard		S-1								
		16 16 18	34				S-2								
		15 28 40	68				S-3						10		242
		13 16 22	38				S-4								
		36 38 40	78				S-5								
		35 50/5	50/3"				S-6								237
		8 11 13	24				S-7								232
228.03	18.50														
		15 17 19	36		SILTY SAND (SM) light brown and light gray, dense		S-8			15	NP	NP	4		227
223.33	23.20														
		4 5 7	12		LEAN CLAY (CL) gray and light brown, stiff		S-9								222
		6 7 7	14				S-10								217

(continued on next page)

DRILLING LOG (Cont Sheet)

INSTALLATION: N/A

PROJECT: Pine Bluff Arsenal Access Control Point
Jefferson County

COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet

VERTICAL: NAVD88

LOCATION COORDINATES: N: 1907263.94 E: 1286488.19

LOCATION METHOD:

ELEV	DEPTH	BLOWS/ 0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
					LEAN CLAY (CL) gray and light brown, stiff										
211.53	35.00	5 6 8	14				S-11								
					Borehole finished at 35.0										

212
207
202
197
192
187
182

DRILLING LOG

DIVISION: Southwestern
INSTALLATION: N/A
Sheet 1 of 2

1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County
10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet
VERTICAL: NAVD88
LOCATION COORDINATES: N: 1907312.03 E: 1286511.32
LOCATION METHOD:
2. HOLE NUMBER: S-5
3. DRILLING AGENCY: Terracon
11. DATE BORING: STARTED Aug 29 2024; COMPLETED Aug 29 2024
4. NAME OF DRILLER: Dakota Sloan
12. HAMMER TYPE: Automatic
EFFICIENCY (%)
5. EQUIPMENT: CME 55 Drill Rig 546
13. SIZE AND TYPE OF BIT: 3.75" HSA
6. DIRECTION OF BORING: Vertical; DEG FROM VERTICAL: 0; BEARING:
14. ELEVATION SURFACE: 245.9'
15. ELEVATION GROUND WATER:
7. THICKNESS OF OVERBURDEN: 35.0'
16. TOTAL NUMBER CORE BOXES:
8. DEPTH DRILLED INTO ROCK:
17. SIGNATURE AND TITLE OF INSPECTOR: JB
9. TOTAL DEPTH OF BORING: 35.0'

ELEV	DEPTH	BLOWS/0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
~~245.62~~	~~0.30~~				Topsoil, Cleared Soils (disturbed), 4 inches										
		5			LEAN CLAY WITH SAND (CL) light gray and light brown, hard										
		15	35				S-1								
		20													
		20													
		18	38				S-2			87	28	11	7		
		20													
		20													
		40	50/5				S-3								
		50	"												
		12													
		13	30				S-4								
		17													
		10													
		12	28				S-5								
		16													
		21													
		44	50/5				S-6								
		50	"												
232.42	13.50														
		6			SANDY LEAN CLAY (CL) light gray and light brown, stiff to very stiff										
		7	16				S-7						12		
		9													
		7													
		9	19				S-8								
		10													
222.42	23.50														
		3			LEAN CLAY (CL) gray and reddish brown, stiff, trace sand										
		4	9				S-9								
		5													
							ST-1								
		4													

(continued on next page)

DRILLING LOG (Cont Sheet)

INSTALLATION: N/A

PROJECT: Pine Bluff Arsenal Access Control Point
Jefferson County

COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet

VERTICAL: NAVD88

LOCATION COORDINATES: N: 1907312.03 E: 1286511.32

LOCATION METHOD:

ELEV	DEPTH	BLOWS/ 0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
		4 5	9		LEAN CLAY (CL) gray and reddish brown, stiff, trace sand		S-10								
		6 6	13				S-11								
210.92	35.00	7			Borehole finished at 35.0										

211
206
201
196
191
186
181

DRILLING LOG

DIVISION: Southwestern
INSTALLATION: N/A
Sheet 1 of 2

1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County
10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet
VERTICAL: NAVD88
LOCATION COORDINATES: N: 1907307.32 E: 1286562.04
LOCATION METHOD:
2. HOLE NUMBER: S-6
3. DRILLING AGENCY: Terracon
11. DATE BORING: STARTED Aug 29 2024; COMPLETED Aug 30 2024
4. NAME OF DRILLER: Dakota Sloan
12. HAMMER TYPE: Automatic
EFFICIENCY (%)
5. EQUIPMENT: CME 55 Drill Rig 546
13. SIZE AND TYPE OF BIT: 3.75" HSA
6. DIRECTION OF BORING: Vertical; DEG FROM VERTICAL: 0; BEARING:
14. ELEVATION SURFACE: 245.7'
15. ELEVATION GROUND WATER:
7. THICKNESS OF OVERBURDEN: 35.0'
16. TOTAL NUMBER CORE BOXES:
8. DEPTH DRILLED INTO ROCK:
17. SIGNATURE AND TITLE OF INSPECTOR: JB
9. TOTAL DEPTH OF BORING: 35.0'

ELEV	DEPTH	BLOWS/0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
~~245.41~~	~~0.30~~				Topsoil, Cleared Soils (disturbed), 4 inches										
		10 27 31	58		SANDY LEAN CLAY (CL) light gray and reddish brown, very stiff to hard		S-1								
		22 14 12	26				S-2								
		10 12 18	30				S-3								241
		22 21 22	43				S-4								
		12 20 22	42				S-5								
		13 17 18 25	35				S-6				34	22	8		236
							ST-1				39	28	12		231
		8 12 18	30				S-7								
227.21	18.50														
		10 11 13	24		CLAYEY SAND (SC) light gray and reddish brown, medium dense		S-8								226
		10 13 13	26				S-9								221
217.21	28.50														
		4 5 6	11		FAT CLAY (CH) gray and reddish brown, stiff, trace sand		S-10			94	65	48	26		216

(continued on next page)

DRILLING LOG (Cont Sheet)

INSTALLATION: N/A

PROJECT: Pine Bluff Arsenal Access Control Point
Jefferson County

COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet

VERTICAL: NAVD88

LOCATION COORDINATES: N: 1907307.32 E: 1286562.04

LOCATION METHOD:

ELEV	DEPTH	BLOWS/ 0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
					FAT CLAY (CH) gray and reddish brown, stiff, trace sand										
210.71	35.00	4 5 6	11				S-11								
					Borehole finished at 35.0										

211
206
201
196
191
186
181

DRILLING LOG

DIVISION: Southwestern
INSTALLATION: N/A
Sheet 1 of 2

1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County
10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet
VERTICAL: NAVD88
LOCATION COORDINATES: N: 1907242.01 E: 1286542.05
LOCATION METHOD:
2. HOLE NUMBER: S-7
3. DRILLING AGENCY: Terracon
11. DATE BORING: STARTED Aug 30 2024; COMPLETED Aug 30 2024
4. NAME OF DRILLER: Dakota Sloan
12. HAMMER TYPE: Automatic
EFFICIENCY (%):
5. EQUIPMENT: CME 55 Drill Rig 546
13. SIZE AND TYPE OF BIT: 3.75" HSA
6. DIRECTION OF BORING: Vertical; DEG FROM VERTICAL: 0; BEARING:
14. ELEVATION SURFACE: 246.8'
15. ELEVATION GROUND WATER:
7. THICKNESS OF OVERBURDEN: 35.0'
16. TOTAL NUMBER CORE BOXES:
8. DEPTH DRILLED INTO ROCK:
17. SIGNATURE AND TITLE OF INSPECTOR: JB
9. TOTAL DEPTH OF BORING: 35.0'

ELEV	DEPTH	BLOWS/0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
~~246.48~~	~~0.30~~				Topsoil, Cleared Soils (disturbed), 4 inches										
		12 20 20	40		LEAN CLAY WITH SAND (CL) light gray and reddish brown, very stiff to hard		S-1								
		17 12 12	24				S-2			84			12		
		10 14 20	34				S-3								242
		12 20 48	68				S-4				34	16	7		
		35 50	50/3"				S-5								
		48 50	50/3"				S-6								
															237
		5 8 9	17				S-7			72	42	28	15		232
228.78	18.00				SANDY SILT (ML) light brown and light gray, dense		ST-1				18	1	15		
		12 14 16	30				S-8								227
223.28	23.50														
		6 10 8	18		SANDY LEAN CLAY (CL) gray and reddish brown, stiff to very stiff		S-9								222
		5 6 8	14				S-10								217

(continued on next page)

DRILLING LOG (Cont Sheet)

INSTALLATION: N/A

PROJECT: Pine Bluff Arsenal Access Control Point
Jefferson County

COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet

VERTICAL: NAVD88

LOCATION COORDINATES: N: 1907242.01 E: 1286542.05

LOCATION METHOD:

ELEV	DEPTH	BLOWS/ 0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
					SANDY LEAN CLAY (CL) gray and reddish brown, stiff to very stiff										
213.28	33.50	3													
		4	9		FAT CLAY (CH) gray, stiff		S-11								
211.78	35.00	5													
					Borehole finished at 35.0										

212
207
202
197
192
187
182

DRILLING LOG

DIVISION: Southwestern
INSTALLATION: N/A
Sheet 1 of 2

1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County
10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet
VERTICAL: NAVD88
LOCATION COORDINATES: N: 1907313.79 E: 1286686.71
LOCATION METHOD:
2. HOLE NUMBER: S-8
3. DRILLING AGENCY: Terracon
11. DATE BORING: STARTED Aug 30 2024; COMPLETED Aug 30 2024
4. NAME OF DRILLER: Dakota Sloan
12. HAMMER TYPE: Automatic
EFFICIENCY (%)
5. EQUIPMENT: CME 55 Drill Rig 546
13. SIZE AND TYPE OF BIT: 3.75" HSA
6. DIRECTION OF BORING: Vertical; DEG FROM VERTICAL: 0; BEARING:
14. ELEVATION SURFACE: 243.7'
15. ELEVATION GROUND WATER:
7. THICKNESS OF OVERBURDEN: 35.0'
16. TOTAL NUMBER CORE BOXES:
8. DEPTH DRILLED INTO ROCK:
17. SIGNATURE AND TITLE OF INSPECTOR: JB
9. TOTAL DEPTH OF BORING: 35.0'

ELEV	DEPTH	BLOWS/0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
~~243.36~~	~~0.30~~				Topsoil, Cleared Soils (disturbed), 4 inches										
		5			LEAN CLAY WITH SAND (CL) light gray and reddish brown,										
		10	22		very stiff to hard		S-1								
		12													
		8													
		10	25				S-2				38	21			
		15													
		15													
		25	50				S-3								239
		25													
		23													
		25	49				S-4								
		24													
		7													
		10	20				S-5								
235.66	8.00	10													
		13			SANDY LEAN CLAY (CL) light gray and light brown, very stiff										
		20	40		to hard		S-6								
		20													
		18													234
							ST-1				21	8	14		
229.16	14.50														
		7			SANDY SILT (ML) light gray and light brown, very stiff to hard										229
		8	22				S-7				NP	NP	12		
		14													
		10													
		12	25				S-8								
		13													224
220.16	23.50														
		8			LEAN CLAY WITH SAND (CL) light gray and reddish brown,										
		10	22		stiff to very stiff		S-9								
		12													
															219
		8													
		7	15				S-10								
		8													214

(continued on next page)

DRILLING LOG (Cont Sheet)

INSTALLATION: N/A

PROJECT: Pine Bluff Arsenal Access Control Point
Jefferson County

COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet

VERTICAL: NAVD88

LOCATION COORDINATES: N: 1907313.79 E: 1286686.71

LOCATION METHOD:

ELEV	DEPTH	BLOWS/ 0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
					LEAN CLAY WITH SAND (CL) light gray and reddish brown, stiff to very stiff										
208.66	35.00	7 7 6	13				S-11								
					Borehole finished at 35.0										

209
204
199
194
189
184
179

DRILLING LOG

DIVISION: Southwestern	INSTALLATION: N/A		Sheet 1 of 1
1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County	10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet		VERTICAL: NAVD88
	LOCATION COORDINATES: N: 1907413.44 E: 1286220.26		LOCATION METHOD:
2. HOLE NUMBER: P-1	3. DRILLING AGENCY: Terracon	11. DATE BORING: STARTED Aug 28 2024	COMPLETED Aug 28 2024
4. NAME OF DRILLER: Dakota Sloan	12. HAMMER TYPE: Automatic		EFFICIENCY (%)
5. EQUIPMENT: CME 55 Drill Rig 546	13. SIZE AND TYPE OF BIT: 3.75" HSA		
6. DIRECTION OF BORING: Vertical; DEG FROM VERTICAL: 0; BEARING:	14. ELEVATION SURFACE: 258.3'		
7. THICKNESS OF OVERBURDEN: 10.5'	15. ELEVATION GROUND WATER:		
8. DEPTH DRILLED INTO ROCK:	16. TOTAL NUMBER CORE BOXES:		
9. TOTAL DEPTH OF BORING: 10.5'	17. SIGNATURE AND TITLE OF INSPECTOR: JB		

ELEV	DEPTH	BLOWS/0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
257.75	0.50				Asphalt, 6 inches										
256.75	1.50				Concrete, 11 inches										
		3 2 2	4		SANDY LEAN CLAY (CL) light brown and light gray, FILL		S-1			69			16		
255.25	3.00														
		2 3 3	6		LEAN CLAY WITH SAND (CL) light gray and light brown, soft to stiff, with sand seams		S-2								
		3 4 3	7				S-3								
		3 4 4	8				S-4								
		1 2 2	4				S-5								
		0 2 3	5				S-6								
247.75	10.50				Borehole finished at 10.5										

254 249 244 239 234 229

Boring Designation **P-2**

DRILLING LOG

DIVISION: Southwestern	INSTALLATION: N/A		Sheet 1 of 1
1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County	10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet		VERTICAL: NAVD88
	LOCATION COORDINATES: N: 1907439.59 E: 1286272.36		LOCATION METHOD:
2. HOLE NUMBER: P-2	3. DRILLING AGENCY: Terracon	11. DATE BORING: STARTED Aug 28 2024	COMPLETED Aug 28 2024
4. NAME OF DRILLER: Dakota Sloan		12. HAMMER TYPE: Automatic	EFFICIENCY (%)
5. EQUIPMENT: CME 55 Drill Rig 546		13. SIZE AND TYPE OF BIT: 3.75" HSA	
6. DIRECTION OF BORING: Vertical	DEG FROM VERTICAL: 0	BEARING:	14. ELEVATION SURFACE: 254.6'
			15. ELEVATION GROUND WATER:
7. THICKNESS OF OVERBURDEN: 10.0'			16. TOTAL NUMBER CORE BOXES:
8. DEPTH DRILLED INTO ROCK:			17. SIGNATURE AND TITLE OF INSPECTOR: JB
9. TOTAL DEPTH OF BORING: 10.0'			

ELEV	DEPTH	BLOWS/0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
~~254.33~~	~~0.30~~				Topsoil, 3 inches										
		7 5 4	9		LEAN CLAY WITH SAND (CL) light brown and brown, medium stiff to stiff		S-1								
		3 3 3	6				S-2								
		2 2 3	5				S-3								
249.63	5.00	3 4 5	9		LEAN CLAY WITH SAND (CL) light gray and brown, medium stiff to stiff		S-4								
		2 4 3	7				S-5								
		3 4 8	12				S-6								
244.63	10.00	15			Borehole finished at 10.0										

250
245
240
235
230
225

DRILLING LOG

DIVISION: Southwestern	INSTALLATION: N/A		Sheet 1 of 1
1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County	10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet		VERTICAL: NAVD88
	LOCATION COORDINATES: N: 1907519.33 E: 1286416.69		LOCATION METHOD:
2. HOLE NUMBER: P-3	3. DRILLING AGENCY: Terracon	11. DATE BORING: STARTED Aug 28 2024	COMPLETED Aug 28 2024
4. NAME OF DRILLER: Dakota Sloan		12. HAMMER TYPE: Automatic	EFFICIENCY (%)
5. EQUIPMENT: CME 55 Drill Rig 546		13. SIZE AND TYPE OF BIT: 3.75" HSA	
6. DIRECTION OF BORING: Vertical	DEG FROM VERTICAL: 0	BEARING:	14. ELEVATION SURFACE: 249.1'
			15. ELEVATION GROUND WATER:
7. THICKNESS OF OVERBURDEN: 10.0'			16. TOTAL NUMBER CORE BOXES:
8. DEPTH DRILLED INTO ROCK:			17. SIGNATURE AND TITLE OF INSPECTOR: JB
9. TOTAL DEPTH OF BORING: 10.0'			

ELEV	DEPTH	BLOWS/0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
248.13	1.00				Asphalt, Asphaltic Cement Concrete - 12 inches										
246.63	2.50	8 4 5	9		LEAN CLAY (CL) gray and brown, stiff, trace sand, FILL		S-1								
		4 4 5	9		LEAN CLAY WITH SAND (CL) gray and brown, soft to very stiff, with sand seams		S-2						17		
		1 2 2	4				S-3								
		8 10 12	22				S-4								
		3 5 6	11				S-5								
		6 8 8	16				S-6								
239.13	10.00				Borehole finished at 10.0										

245
240
235
230
225
220

DRILLING LOG

DIVISION: Southwestern
INSTALLATION: N/A
Sheet 1 of 1

1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County
10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet
VERTICAL: NAVD88
LOCATION COORDINATES: N: 1907641.68 E: 1286379.13
LOCATION METHOD:
2. HOLE NUMBER: P-4
3. DRILLING AGENCY: Terracon
11. DATE BORING: STARTED Aug 28 2024; COMPLETED Aug 28 2024
4. NAME OF DRILLER: Dakota Sloan
12. HAMMER TYPE: Automatic
EFFICIENCY (%):
5. EQUIPMENT: CME 55 Drill Rig 546
13. SIZE AND TYPE OF BIT: 3.75" HSA
6. DIRECTION OF BORING: Vertical; DEG FROM VERTICAL: 0; BEARING:
14. ELEVATION SURFACE: 246.7'
15. ELEVATION GROUND WATER:
7. THICKNESS OF OVERBURDEN: 10.0'
16. TOTAL NUMBER CORE BOXES:
8. DEPTH DRILLED INTO ROCK:
17. SIGNATURE AND TITLE OF INSPECTOR: JB
9. TOTAL DEPTH OF BORING: 10.0'

ELEV	DEPTH	BLOWS/ 0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
246.20	0.50				Asphalt, Asphaltic Cement Concrete - 6 inches										
244.70	2.00	11 7 3	10		LEAN CLAY WITH GRAVEL (CL) reddish brown and brown, stiff, FILL		S-1			50			11		
		3 4 7	11		LEAN CLAY WITH SAND (CL) light gray and light brown, stiff to hard, becoming sandier with depth		S-2								
		4 8 12	20				S-3								
		10 9 8	17				S-4								
		3 4 6	10				S-5								
		15 16 18	34				S-6								
236.70	10.00	17			Borehole finished at 10.0										

242
237
232
227
222
217

DRILLING LOG

DIVISION: Southwestern	INSTALLATION: N/A		Sheet 1 of 1
1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County	10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet		VERTICAL: NAVD88
	LOCATION COORDINATES: N: 1907377.96 E: 1286290.72		LOCATION METHOD:
2. HOLE NUMBER: P-5	3. DRILLING AGENCY: Terracon	11. DATE BORING: STARTED Aug 28 2024	COMPLETED Aug 28 2024
4. NAME OF DRILLER: Dakota Sloan	12. HAMMER TYPE: Automatic		EFFICIENCY (%)
5. EQUIPMENT: CME 55 Drill Rig 546	13. SIZE AND TYPE OF BIT: 3.75" HSA		
6. DIRECTION OF BORING: Vertical; DEG FROM VERTICAL: 0; BEARING:	14. ELEVATION SURFACE: 246.7'		
7. THICKNESS OF OVERBURDEN: 10.0'	15. ELEVATION GROUND WATER:		
8. DEPTH DRILLED INTO ROCK:	16. TOTAL NUMBER CORE BOXES:		
9. TOTAL DEPTH OF BORING: 10.0'	17. SIGNATURE AND TITLE OF INSPECTOR: JB		

ELEV	DEPTH	BLOWS/0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
246.45	0.20				Topsoil, Grass										
		8 9 6	15		LEAN CLAY WITH SAND (CL) brown and light gray, stiff to hard		S-1						19		
		6 6 8	14				S-2								
		18 16 16	32				S-3								
		5 6 8	14				S-4								
240.15	6.50	12 15 22	37		SANDY LEAN CLAY (CL) light gray and brown, hard		S-5								
		18 18 14 12	32				S-6								
236.65	10.00				Borehole finished at 10.0										

242 237 232 227 222 217

DRILLING LOG

DIVISION: Southwestern	INSTALLATION: N/A		Sheet 1 of 1
1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County	10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet		VERTICAL: NAVD88
	LOCATION COORDINATES: N: 1907435.50 E: 1286398.15		LOCATION METHOD:
2. HOLE NUMBER: P-6	3. DRILLING AGENCY: Terracon	11. DATE BORING: STARTED Aug 28 2024	COMPLETED Aug 28 2024
4. NAME OF DRILLER: Dakota Sloan	12. HAMMER TYPE: Automatic		EFFICIENCY (%)
5. EQUIPMENT: CME 55 Drill Rig 546	13. SIZE AND TYPE OF BIT: 3.75" HSA		
6. DIRECTION OF BORING: Vertical / DEG FROM VERTICAL: 0 / BEARING:	14. ELEVATION SURFACE: 246.5'		
7. THICKNESS OF OVERBURDEN: 10.0'	15. ELEVATION GROUND WATER:		
8. DEPTH DRILLED INTO ROCK:	16. TOTAL NUMBER CORE BOXES:		
9. TOTAL DEPTH OF BORING: 10.0'	17. SIGNATURE AND TITLE OF INSPECTOR: JB		

ELEV	DEPTH	BLOWS/ 0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
246.33	0.20				Topsoil, Grass										
		5			LEAN CLAY WITH SAND (CL) light brown and light gray, stiff to hard										
		5	11				S-1								
		6													
		8													
		10	24				S-2								
		14													
		15													
		15	42				S-3								
		27													
		12													
		12	32				S-4								
240.03	6.50	20													
		19			SANDY LEAN CLAY (CL) brown and light brown, hard										
		21	41				S-5								
		20													
		18													
		20													
		19	39				S-6								
236.53	10.00	20													
					Borehole finished at 10.0										

242 237 232 227 222 217

DRILLING LOG

DIVISION: Southwestern	INSTALLATION: N/A		Sheet 1 of 1
1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County	10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet		VERTICAL: NAVD88
	LOCATION COORDINATES: N: 1907278.93 E: 1286251.23		LOCATION METHOD:
2. HOLE NUMBER: P-7	3. DRILLING AGENCY: Terracon	11. DATE BORING: STARTED Aug 27 2024	COMPLETED Aug 27 2024
4. NAME OF DRILLER: Dakota Sloan		12. HAMMER TYPE: Automatic	EFFICIENCY (%)
5. EQUIPMENT: CME 55 Drill Rig 546		13. SIZE AND TYPE OF BIT: 3.75" HSA	
6. DIRECTION OF BORING: Vertical	DEG FROM VERTICAL: 0	BEARING:	14. ELEVATION SURFACE: 245.0'
			15. ELEVATION GROUND WATER:
7. THICKNESS OF OVERBURDEN: 10.0'			16. TOTAL NUMBER CORE BOXES:
8. DEPTH DRILLED INTO ROCK:			17. SIGNATURE AND TITLE OF INSPECTOR: JB
9. TOTAL DEPTH OF BORING: 10.0'			

ELEV	DEPTH	BLOWS/0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
244.88	0.10				Asphalt, Asphaltic Cement Concrete - less than 1 inch										
		7			LEAN CLAY (CL) light gray and light brown, stiff to hard										
		8	18				S-1				30	12	22		
		10													
		30													
		27	49				S-2								
		22													
		18													
		15													
		12	27				S-3								
		5													
		7	14				S-4								
		7													
		7			*with sand lenses at about 6.5 feet*										
		8	18				S-5								
		10													
		10													
		12	24				S-6								
234.98	10.00	12													
		10													
					Borehole finished at 10.0										

240
235
230
225
220
215

DRILLING LOG

DIVISION: Southwestern
INSTALLATION: N/A
Sheet 1 of 1

1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County
10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet
VERTICAL: NAVD88
LOCATION COORDINATES: N: 1907325.35 E: 1286310.00
LOCATION METHOD:
2. HOLE NUMBER: P-8
3. DRILLING AGENCY: Terracon
11. DATE BORING: STARTED Aug 27 2024; COMPLETED Aug 27 2024
4. NAME OF DRILLER: Dakota Sloan
12. HAMMER TYPE: Automatic
EFFICIENCY (%):
5. EQUIPMENT: CME 55 Drill Rig 546
13. SIZE AND TYPE OF BIT: 3.75" HSA
6. DIRECTION OF BORING: Vertical; DEG FROM VERTICAL: 0; BEARING:
14. ELEVATION SURFACE: 245.8'
15. ELEVATION GROUND WATER:
7. THICKNESS OF OVERBURDEN: 10.0'
16. TOTAL NUMBER CORE BOXES:
8. DEPTH DRILLED INTO ROCK:
17. SIGNATURE AND TITLE OF INSPECTOR: JB
9. TOTAL DEPTH OF BORING: 10.0'

ELEV	DEPTH	BLOWS/ 0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
245.74	0.10				Asphalt, Asphaltic Cement Concrete - less than 1 inch										
		4			LEAN CLAY (CL) light gray and light brown, very stiff to hard, becoming sandy with depth										
		5	20				S-1								
		15													
		24													
		24	43				S-2								
		19													
		13													
		11	22				S-3								
240.84	5.00	11													
		7			SANDY LEAN CLAY (CL) light gray and light brown, medium stiff to very stiff, with sand lenses										
		9	21				S-4								
		12													
		10													
		10	20				S-5								
		10													
		2													
		3													
		2	5				S-6								
235.84	10.00	3													
					Borehole finished at 10.0										

241
236
231
226
221
216

DRILLING LOG

DIVISION: Southwestern
INSTALLATION: N/A
Sheet 1 of 1

1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County
10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet
VERTICAL: NAVD88
LOCATION COORDINATES: N: 1907330.37 E: 1286410.69
LOCATION METHOD:
2. HOLE NUMBER: P-9
3. DRILLING AGENCY: Terracon
11. DATE BORING: STARTED Aug 27 2024; COMPLETED Aug 27 2024
4. NAME OF DRILLER: Dakota Sloan
12. HAMMER TYPE: Automatic
EFFICIENCY (%)
5. EQUIPMENT: CME 55 Drill Rig 546
13. SIZE AND TYPE OF BIT: 3.75" HSA
6. DIRECTION OF BORING: Vertical; DEG FROM VERTICAL: 0; BEARING:
14. ELEVATION SURFACE: 244.3'
15. ELEVATION GROUND WATER:
7. THICKNESS OF OVERBURDEN: 10.0'
16. TOTAL NUMBER CORE BOXES:
8. DEPTH DRILLED INTO ROCK:
17. SIGNATURE AND TITLE OF INSPECTOR: JB
9. TOTAL DEPTH OF BORING: 10.0'

ELEV	DEPTH	BLOWS/ 0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
~~244.17~~	~~0.10~~				Asphalt, Asphaltic Cement Concrete - less than 1 inch, grass grown on top of asphalt										
243.97	0.30	7			Crushed stone, Aggregate Base Course - 2 inches										
		8	18		LEAN CLAY (CL) light gray and light brown, very stiff to hard		S-1								
		10													
		30													
		27	49				S-2			79			13		
		22													
		18													
		15	27				S-3								
		12													
		5													
		7	14				S-4								
		7													
		7													
		8	18				S-5								
236.27	8.00	10													
		10			SANDY LEAN CLAY (CL) brown and light brown, very stiff										
		12	24				S-6								
		12													
234.27	10.00	10													
					Borehole finished at 10.0										

240
235
230
225
220
215

DRILLING LOG

DIVISION: Southwestern	INSTALLATION: N/A		Sheet 1 of 1
1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County	10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet		VERTICAL: NAVD88
	LOCATION COORDINATES: N: 1907412.19 E: 1286461.08		LOCATION METHOD:
2. HOLE NUMBER: P-10	3. DRILLING AGENCY: Terracon	11. DATE BORING: STARTED Aug 27 2024	COMPLETED Aug 27 2024
4. NAME OF DRILLER: Dakota Sloan	12. HAMMER TYPE: Automatic		EFFICIENCY (%)
5. EQUIPMENT: CME 55 Drill Rig 546	13. SIZE AND TYPE OF BIT: 3.75" HSA		
6. DIRECTION OF BORING: Vertical; DEG FROM VERTICAL: 0; BEARING:	14. ELEVATION SURFACE: 245.5'		
7. THICKNESS OF OVERBURDEN: 10.0'	15. ELEVATION GROUND WATER:		
8. DEPTH DRILLED INTO ROCK:	16. TOTAL NUMBER CORE BOXES:		
9. TOTAL DEPTH OF BORING: 10.0'	17. SIGNATURE AND TITLE OF INSPECTOR: JB		

ELEV	DEPTH	BLOWS/ 0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
244.99	0.50				Cleared Soils (disturbed), 6 inches										
		8 8 12	20		LEAN CLAY WITH SAND (CL) light brown, very stiff to hard, becoming sandier with depth		S-1								
		9 10 9	19				S-2								
		4 7 9	16				S-3								
		5 10 20	30				S-4								
238.99	6.50	27 48 44	92		CLAYEY SAND (SC) light gray and light brown, very dense		S-5								
		30 35 34 30	69				S-6								
235.49	10.00				Borehole finished at 10.0										

241 236 231 226 221 216

DRILLING LOG

DIVISION: Southwestern	INSTALLATION: N/A		Sheet 1 of 1
1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County	10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet		VERTICAL: NAVD88
	LOCATION COORDINATES: N: 1907407.59 E: 1286573.32		LOCATION METHOD:
2. HOLE NUMBER: P-11	3. DRILLING AGENCY: Terracon	11. DATE BORING: STARTED Aug 27 2024	COMPLETED Sep 04 2024
4. NAME OF DRILLER: Dakota Sloan	12. HAMMER TYPE: Automatic		EFFICIENCY (%)
5. EQUIPMENT: CME 55 Drill Rig 546	13. SIZE AND TYPE OF BIT: 3.75" HSA		
6. DIRECTION OF BORING: Vertical; DEG FROM VERTICAL: 0; BEARING:	14. ELEVATION SURFACE: 246.4'		
7. THICKNESS OF OVERBURDEN: 10.0'	15. ELEVATION GROUND WATER:		
8. DEPTH DRILLED INTO ROCK:	16. TOTAL NUMBER CORE BOXES:		
9. TOTAL DEPTH OF BORING: 10.0'	17. SIGNATURE AND TITLE OF INSPECTOR: JB		

ELEV	DEPTH	BLOWS/0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
245.91	0.50				Topsoil, Cleared Soils (disturbed), 6 inches										
		13 15 14	29		LEAN CLAY (CL) reddish brown, very stiff to very hard		S-1								
		17 20 20	40				S-2								
		18 20 23	43				S-3								
		15 15 18	33				S-4								
239.41	7.00	23					S-5								
		30 38	68		LEAN CLAY (CL) gray and brown, hard										
		30 28 34	62				S-6								
236.41	10.00	35			Borehole finished at 10.0										

242
237
232
227
222
217

DRILLING LOG

DIVISION: Southwestern	INSTALLATION: N/A		Sheet 1 of 1
1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County	10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet		VERTICAL: NAVD88
	LOCATION COORDINATES: N: 1907195.92 E: 1286302.36		LOCATION METHOD:
2. HOLE NUMBER: P-12	3. DRILLING AGENCY: Terracon	11. DATE BORING: STARTED Aug 27 2024	COMPLETED Aug 27 2024
4. NAME OF DRILLER: Dakota Sloan	12. HAMMER TYPE: Automatic		EFFICIENCY (%)
5. EQUIPMENT: CME 55 Drill Rig 546	13. SIZE AND TYPE OF BIT: 3.75" HSA		
6. DIRECTION OF BORING: Vertical; DEG FROM VERTICAL: 0; BEARING:	14. ELEVATION SURFACE: 243.7'		
7. THICKNESS OF OVERBURDEN: 10.0'	15. ELEVATION GROUND WATER:		
8. DEPTH DRILLED INTO ROCK:	16. TOTAL NUMBER CORE BOXES:		
9. TOTAL DEPTH OF BORING: 10.0'	17. SIGNATURE AND TITLE OF INSPECTOR: JB		

ELEV	DEPTH	BLOWS/ 0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
~~243.47~~	~~0.20~~				Asphalt, 1.5 inches										
243.17	0.50				Crushed stone, Aggregate Base Course, 3 inches										
		10 15 15	30		SANDY LEAN CLAY (CL) brown and light gray, medium stiff to hard, with lean clay lenses		S-1				33	17	15		
		13 12 13	25				S-2								
		12 14 14	28				S-3								
		10 10 8	18				S-4								
		5 4 4	8				S-5								
		7 10 12	22				S-6								
233.67	10.00	10													
					Borehole finished at 10.0										

239
234
229
224
219
214

DRILLING LOG

DIVISION: Southwestern
INSTALLATION: N/A
Sheet 1 of 1

1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County
10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet
VERTICAL: NAVD88
LOCATION COORDINATES: N: 1907247.50 E: 1286384.69
LOCATION METHOD:
2. HOLE NUMBER: P-13
3. DRILLING AGENCY: Terracon
11. DATE BORING: STARTED Aug 27 2024; COMPLETED Aug 27 2024
4. NAME OF DRILLER: Dakota Sloan
12. HAMMER TYPE: Automatic
EFFICIENCY (%):
5. EQUIPMENT: CME 55 Drill Rig 546
13. SIZE AND TYPE OF BIT: 3.75" HSA
6. DIRECTION OF BORING: Vertical; DEG FROM VERTICAL: 0; BEARING:
14. ELEVATION SURFACE: 246.0'
15. ELEVATION GROUND WATER:
7. THICKNESS OF OVERBURDEN: 10.0'
16. TOTAL NUMBER CORE BOXES:
8. DEPTH DRILLED INTO ROCK:
17. SIGNATURE AND TITLE OF INSPECTOR: JB
9. TOTAL DEPTH OF BORING: 10.0'

ELEV	DEPTH	BLOWS/0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
245.80	0.20				Topsoil, 2 inches										
		17			LEAN CLAY WITH SAND (CL) light brown, very stiff to hard										
		22	41				S-1								
		19													
		16													
		38	50/3"				S-2								
		50													
		50	50/5"				S-3								
		7													
		10	28				S-4								
239.50	6.50	18													
		20			SANDY LEAN CLAY (CL) light brown, hard										
		25	53				S-5								
238.00	8.00	28													
		40			CLAYEY SAND (SC) light brown and light gray, very dense										
		32	52				S-6								
		20													
236.00	10.00	16													
					Borehole finished at 10.0										

241
236
231
226
221
216

DRILLING LOG

DIVISION: Southwestern	INSTALLATION: N/A		Sheet 1 of 1
1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County	10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet		VERTICAL: NAVD88
	LOCATION COORDINATES: N: 1907127.23 E: 1286345.12		LOCATION METHOD:
2. HOLE NUMBER: P-14	3. DRILLING AGENCY: Terracon	11. DATE BORING: STARTED Aug 26 2024	COMPLETED Aug 26 2024
4. NAME OF DRILLER: Dakota Sloan	12. HAMMER TYPE: Automatic		EFFICIENCY (%)
5. EQUIPMENT: CME 55 Drill Rig 546	13. SIZE AND TYPE OF BIT: 3.75" HSA		
6. DIRECTION OF BORING: Vertical; DEG FROM VERTICAL: 0; BEARING:	14. ELEVATION SURFACE: 243.7'		
7. THICKNESS OF OVERBURDEN: 10.0'	15. ELEVATION GROUND WATER:		
8. DEPTH DRILLED INTO ROCK:	16. TOTAL NUMBER CORE BOXES:		
9. TOTAL DEPTH OF BORING: 10.0'	17. SIGNATURE AND TITLE OF INSPECTOR: DT		

ELEV	DEPTH	BLOWS/ 0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
		5, 7, 2	9		LEAN CLAY (CL) gray and brown, stiff to very stiff		S-1								
		12, 11, 12	23				S-2								
		10, 11, 13	24				S-3								
		4, 4, 6	10				S-4								
		4, 5, 4, 4	9		*sandy lean clay at about 6.5 to 8.5 feet*		S-5								
233.67	10.00	5, 8, 10	18				S-6								
					Borehole finished at 10.0										

239
234
229
224
219
214

DRILLING LOG

DIVISION: Southwestern	INSTALLATION: N/A		Sheet 1 of 1
1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County	10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet		VERTICAL: NAVD88
	LOCATION COORDINATES: N: 1907169.70 E: 1286421.63		LOCATION METHOD:
2. HOLE NUMBER: P-15	3. DRILLING AGENCY: Terracon	11. DATE BORING: STARTED Aug 27 2024	COMPLETED Aug 27 2024
4. NAME OF DRILLER: Dakota Sloan	12. HAMMER TYPE: Automatic		EFFICIENCY (%)
5. EQUIPMENT: CME 55 Drill Rig 546	13. SIZE AND TYPE OF BIT: 3.75" HSA		
6. DIRECTION OF BORING: Vertical / DEG FROM VERTICAL: 0 / BEARING:	14. ELEVATION SURFACE: 246.2'		
7. THICKNESS OF OVERBURDEN: 8.9'	15. ELEVATION GROUND WATER:		
8. DEPTH DRILLED INTO ROCK:	16. TOTAL NUMBER CORE BOXES:		
9. TOTAL DEPTH OF BORING: 8.9'	17. SIGNATURE AND TITLE OF INSPECTOR: JB		

ELEV	DEPTH	BLOWS/0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
245.96	0.20				Topsoil, 2 inches										
		16 24 22	46		LEAN CLAY (CL) light brown and light gray, hard, with sand seams		S-1								
		12 14 45	59				S-2				40	24	11		
		30 50	50/5 "				S-3								
		50	50/5 "				S-4								
		6 12 18	30				S-5								
237.26	8.90	34 50	50/5 "				S-6								
					Borehole finished at 8.9										

242
237
232
227
222
217

DRILLING LOG

DIVISION: Southwestern
INSTALLATION: N/A
Sheet 1 of 1

1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County
10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet
VERTICAL: NAVD88
LOCATION COORDINATES: N: 1907308.09 E: 1286623.82
LOCATION METHOD:
2. HOLE NUMBER: P-16
3. DRILLING AGENCY: Terracon
11. DATE BORING: STARTED Sep 30 2024; COMPLETED Aug 30 2024
4. NAME OF DRILLER: Dakota Sloan
12. HAMMER TYPE: Automatic
EFFICIENCY (%)
5. EQUIPMENT: CME 55 Drill Rig 546
13. SIZE AND TYPE OF BIT: 3.75" HSA
6. DIRECTION OF BORING: Vertical; DEG FROM VERTICAL: 0; BEARING:
14. ELEVATION SURFACE: 244.9'
15. ELEVATION GROUND WATER:
7. THICKNESS OF OVERBURDEN: 10.0'
16. TOTAL NUMBER CORE BOXES:
8. DEPTH DRILLED INTO ROCK:
17. SIGNATURE AND TITLE OF INSPECTOR: JB
9. TOTAL DEPTH OF BORING: 10.0'

ELEV	DEPTH	BLOWS/0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
~~244.55~~	~~0.30~~				Topsoil, Cleared Soils (disturbed), 4 inches										
		10 12 10	22		SANDY LEAN CLAY (CL) light gray and reddish brown, very stiff to very hard		S-1								
		12 10 9	19				S-2								
		5 10 30	40				S-3								
		45 50	50/5"				S-4								
		23 43 49	92				S-6								
236.85	8.00	15 20 21 21	41		CLAYEY SAND (SC) light gray and reddish brown, dense		S-7								
234.85	10.00				Borehole finished at 10.0										

240
235
230
225
220
215

DRILLING LOG

DIVISION: Southwestern	INSTALLATION: N/A		Sheet 1 of 1
1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County	10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet		VERTICAL: NAVD88
	LOCATION COORDINATES: N: 1907408.02 E: 1286641.81		LOCATION METHOD:
2. HOLE NUMBER: P-17	3. DRILLING AGENCY: Terracon	11. DATE BORING: STARTED Aug 27 2024	COMPLETED Sep 04 2024
4. NAME OF DRILLER: Dakota Sloan	12. HAMMER TYPE: Automatic		EFFICIENCY (%)
5. EQUIPMENT: CME 55 Drill Rig 546	13. SIZE AND TYPE OF BIT: 3.75" HSA		
6. DIRECTION OF BORING: Vertical / DEG FROM VERTICAL: 0 / BEARING:	14. ELEVATION SURFACE: 245.9'		
7. THICKNESS OF OVERBURDEN: 10.0'	15. ELEVATION GROUND WATER:		
8. DEPTH DRILLED INTO ROCK:	16. TOTAL NUMBER CORE BOXES:		
9. TOTAL DEPTH OF BORING: 10.0'	17. SIGNATURE AND TITLE OF INSPECTOR: JB		

ELEV	DEPTH	BLOWS/0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
245.37	0.50				Topsoil, Cleared Soils (disturbed), 6 inches										
		8 9 8	17		LEAN CLAY (CL) reddish brown, very stiff to hard		S-1								
		10 10 11	21				S-2								
		12 23 17	40				S-3								
240.87	5.00														
		12 15 18	33		LEAN CLAY (CL) gray and brown, hard		S-4								
		17 20 25	45				S-5								
		15 18 22	40				S-6								
235.87	10.00	26													
					Borehole finished at 10.0										

241
236
231
226
221
216

DRILLING LOG

DIVISION: Southwestern	INSTALLATION: N/A		Sheet 1 of 1
1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County	10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet		VERTICAL: NAVD88
	LOCATION COORDINATES: N: 1907405.82 E: 1286759.61		LOCATION METHOD:
2. HOLE NUMBER: P-18	3. DRILLING AGENCY: Terracon	11. DATE BORING: STARTED Sep 03 2024	COMPLETED Sep 03 2024
4. NAME OF DRILLER: Dakota Sloan	12. HAMMER TYPE: Automatic		EFFICIENCY (%)
5. EQUIPMENT: CME 55 Drill Rig 546	13. SIZE AND TYPE OF BIT: 3.75" HSA		
6. DIRECTION OF BORING: Vertical; DEG FROM VERTICAL: 0; BEARING:	14. ELEVATION SURFACE: 244.6'		
7. THICKNESS OF OVERBURDEN: 10.0'	15. ELEVATION GROUND WATER:		
8. DEPTH DRILLED INTO ROCK:	16. TOTAL NUMBER CORE BOXES:		
9. TOTAL DEPTH OF BORING: 10.0'	17. SIGNATURE AND TITLE OF INSPECTOR: EB		

ELEV	DEPTH	BLOWS/ 0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
244.05	0.50				Topsoil, Cleared Soils (disturbed), 6 inches										
		25 40 38	78		SILT WITH SAND (ML) reddish brown, very stiff to hard		S-1			77			6		
		30 20 23	43				S-2								
		10 11 7	18				S-3								
		10 17 23	40				S-4								
238.05	6.50	18 20 30	50		SILTY SAND (SM) light gray and brown, very dense		S-5			48			15		
		32 21 30 35	51				S-6								
234.55	10.00				Borehole finished at 10.0										

240 235 230 225 220 215

DRILLING LOG

DIVISION: Southwestern	INSTALLATION: N/A		Sheet 1 of 1
1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County	10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet		VERTICAL: NAVD88
	LOCATION COORDINATES: N: 1907453.32 E: 1286824.26		LOCATION METHOD:
2. HOLE NUMBER: P-19	3. DRILLING AGENCY: Terracon	11. DATE BORING: STARTED Sep 03 2024	COMPLETED Sep 03 2024
4. NAME OF DRILLER: Dakota Sloan	12. HAMMER TYPE: Automatic		EFFICIENCY (%)
5. EQUIPMENT: CME 55 Drill Rig 546	13. SIZE AND TYPE OF BIT: 3.75" HSA		
6. DIRECTION OF BORING: Vertical; DEG FROM VERTICAL: 0; BEARING:	14. ELEVATION SURFACE: 244.5'		
7. THICKNESS OF OVERBURDEN: 10.0'	15. ELEVATION GROUND WATER:		
8. DEPTH DRILLED INTO ROCK:	16. TOTAL NUMBER CORE BOXES:		
9. TOTAL DEPTH OF BORING: 10.0'	17. SIGNATURE AND TITLE OF INSPECTOR: EB		

ELEV	DEPTH	BLOWS/ 0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
244.00	0.50				Topsoil, Cleared Soils (disturbed), 6 inches										
		14 21 21	42		SANDY LEAN CLAY (CL) reddish brown and gray, stiff to hard		S-1								
		11 15 18	33				S-2								
		5 5 5	10				S-3								
		5 6 5	11				S-4								
		5 10 21	31				S-5								
236.50	8.00														
		22 18 14	32		CLAYEY SAND (SC) light gray and brown, medium dense to dense		S-6								
234.50	10.00	10													
					Borehole finished at 10.0										

240
235
230
225
220
215

DRILLING LOG

DIVISION: Southwestern	INSTALLATION: N/A		Sheet 1 of 1
1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County	10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet		VERTICAL: NAVD88
	LOCATION COORDINATES: N: 1907497.78 E: 1286877.21		LOCATION METHOD:
2. HOLE NUMBER: P-20	3. DRILLING AGENCY: Terracon	11. DATE BORING: STARTED Sep 03 2024	COMPLETED Sep 03 2024
4. NAME OF DRILLER: Dakota Sloan	12. HAMMER TYPE: Automatic		EFFICIENCY (%)
5. EQUIPMENT: CME 55 Drill Rig 546	13. SIZE AND TYPE OF BIT: 3.75" HSA		
6. DIRECTION OF BORING: Vertical / DEG FROM VERTICAL: 0 / BEARING:	14. ELEVATION SURFACE: 246.8'		
7. THICKNESS OF OVERBURDEN: 10.0'	15. ELEVATION GROUND WATER:		
8. DEPTH DRILLED INTO ROCK:	16. TOTAL NUMBER CORE BOXES:		
9. TOTAL DEPTH OF BORING: 10.0'	17. SIGNATURE AND TITLE OF INSPECTOR: EB		

ELEV	DEPTH	BLOWS/0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
246.27	0.50				Topsoil, Cleared Soils (disturbed), 6 inches										
		30 50	50/5"		SANDY LEAN CLAY (CL) reddish brown, hard		S-1								
		36 38 31	69				S-2								
		12 17 35	52				S-3								
		33 38 48	86				S-4								
240.27	6.50	45 48 50	50/2"		CLAYEY SAND WITH GRAVEL (SC) light gray and brown, dense to very dense		S-5						5		
		15 20 22	42				S-6			32					
236.77	10.00	24			Borehole finished at 10.0										

242 237 232 227 222 217

DRILLING LOG

DIVISION: Southwestern	INSTALLATION: N/A		Sheet 1 of 1
1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County	10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet		VERTICAL: NAVD88
	LOCATION COORDINATES: N: 1907572.41 E: 1286880.75		LOCATION METHOD:
2. HOLE NUMBER: P-21	3. DRILLING AGENCY: Terracon	11. DATE BORING: STARTED Sep 03 2024	COMPLETED Sep 03 2024
4. NAME OF DRILLER: Dakota Sloan	12. HAMMER TYPE: Automatic		EFFICIENCY (%)
5. EQUIPMENT: CME 55 Drill Rig 546	13. SIZE AND TYPE OF BIT: 3.75" HSA		
6. DIRECTION OF BORING: Vertical; DEG FROM VERTICAL: 0; BEARING:	14. ELEVATION SURFACE: 246.4'		
7. THICKNESS OF OVERBURDEN: 10.0'	15. ELEVATION GROUND WATER:		
8. DEPTH DRILLED INTO ROCK:	16. TOTAL NUMBER CORE BOXES:		
9. TOTAL DEPTH OF BORING: 10.0'	17. SIGNATURE AND TITLE OF INSPECTOR: EB		

ELEV	DEPTH	BLOWS/ 0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
245.89	0.50				Topsoil, Cleared Soils (disturbed), 6 inches										
		11			SILT WITH SAND (ML) reddish brown, very stiff to hard										
		13	27				S-1						6		
		14													
		12													
		14	34				S-2								
		20													
		9													
		15	53				S-3								
		38													
		20													
		50	50/5"				S-4								
		50	50/5"				S-5								
238.39	8.00														
		10			SILTY SAND (SM) light gray and brown, dense										
		14													
		17	31				S-6								
236.39	10.00	24													
					Borehole finished at 10.0										

242
237
232
227
222
217

DRILLING LOG

DIVISION: Southwestern	INSTALLATION: N/A		Sheet 1 of 1
1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County	10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet		VERTICAL: NAVD88
	LOCATION COORDINATES: N: 1907647.26 E: 1286864.78		LOCATION METHOD:
2. HOLE NUMBER: P-22	3. DRILLING AGENCY: Terracon	11. DATE BORING: STARTED Sep 03 2024	COMPLETED Sep 03 2024
4. NAME OF DRILLER: Dakota Sloan	12. HAMMER TYPE: Automatic		EFFICIENCY (%)
5. EQUIPMENT: CME 55 Drill Rig 546	13. SIZE AND TYPE OF BIT: 3.75" HSA		
6. DIRECTION OF BORING: Vertical / DEG FROM VERTICAL: 0 / BEARING:	14. ELEVATION SURFACE: 246.3'		
7. THICKNESS OF OVERBURDEN: 10.0'	15. ELEVATION GROUND WATER:		
8. DEPTH DRILLED INTO ROCK:	16. TOTAL NUMBER CORE BOXES:		
9. TOTAL DEPTH OF BORING: 10.0'	17. SIGNATURE AND TITLE OF INSPECTOR: EB		

ELEV	DEPTH	BLOWS/0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
245.81	0.50				Topsoil, Cleared Soils (disturbed), 6 inches										
		14 18 20	38		SANDY FAT CLAY (CH) reddish brown, hard		S-1								
		16 14 20	34				S-2				56	39	9		
		20 18 16	34				S-3								
		28 32 33	65				S-4								
		30 28 35	63				S-5								
		40 50	50/5"				S-6								
236.31	10.00				Borehole finished at 10.0										

242
237
232
227
222
217

DRILLING LOG

DIVISION: Southwestern	INSTALLATION: N/A		Sheet 1 of 1
1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County	10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet		VERTICAL: NAVD88
	LOCATION COORDINATES: N: 1907727.18 E: 1286845.57		LOCATION METHOD:
2. HOLE NUMBER: P-23	3. DRILLING AGENCY: Terracon	11. DATE BORING: STARTED Sep 03 2024	COMPLETED Sep 03 2024
4. NAME OF DRILLER: Dakota Sloan	12. HAMMER TYPE: Automatic		EFFICIENCY (%)
5. EQUIPMENT: CME 55 Drill Rig 546	13. SIZE AND TYPE OF BIT: 3.75" HSA		
6. DIRECTION OF BORING: Vertical; DEG FROM VERTICAL: 0; BEARING:	14. ELEVATION SURFACE: 245.6'		
7. THICKNESS OF OVERBURDEN: 10.0'	15. ELEVATION GROUND WATER:		
8. DEPTH DRILLED INTO ROCK:	16. TOTAL NUMBER CORE BOXES:		
9. TOTAL DEPTH OF BORING: 10.0'	17. SIGNATURE AND TITLE OF INSPECTOR: EB		

ELEV	DEPTH	BLOWS/0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
244.57	1.00	4			Topsoil, 12 inches										
		5 10	15		SANDY LEAN CLAY (CL) reddish brown and light gray, stiff to hard		S-1								
		32 48 48	96				S-2								
		13 17 16	33				S-3								
		21 23 35	58				S-4								
		25 28 32	60				S-5								
237.57	8.00	26 23 24 23	47		CLAYEY SAND (SC) light gray and brown, dense		S-6								
235.57	10.00				Borehole finished at 10.0										

241
236
231
226
221
216

DRILLING LOG

DIVISION: Southwestern
INSTALLATION: N/A
Sheet 1 of 1

1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County
10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet
VERTICAL: NAVD88
LOCATION COORDINATES: N: 1907800.07 E: 1286864.83
LOCATION METHOD:
2. HOLE NUMBER: P-24
3. DRILLING AGENCY: Terracon
11. DATE BORING: STARTED Aug 29 2024 COMPLETED Aug 29 2024
4. NAME OF DRILLER: Dakota Sloan
12. HAMMER TYPE: Automatic
EFFICIENCY (%)
5. EQUIPMENT: CME 55 Drill Rig 546
13. SIZE AND TYPE OF BIT: 3.75" HSA
6. DIRECTION OF BORING: Vertical
DEG FROM VERTICAL: 0
BEARING:
14. ELEVATION SURFACE: 246.3'
15. ELEVATION GROUND WATER:
7. THICKNESS OF OVERBURDEN: 10.0'
16. TOTAL NUMBER CORE BOXES:
8. DEPTH DRILLED INTO ROCK:
17. SIGNATURE AND TITLE OF INSPECTOR: DT
9. TOTAL DEPTH OF BORING: 10.0'

ELEV	DEPTH	BLOWS/ 0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
246.15	0.20				Topsoil, 2 inches										
		10 8 7	15		SANDY LEAN CLAY (CL) light brown and light gray, stiff to hard		S-1								
		6 6 7	13				S-2								
		6 10 15	25				S-3								
		15 16 15	31				S-4								
		4 6 10	16				S-5								
		10 12 13	25				S-6								
236.35	10.00	13			Borehole finished at 10.0										

242
237
232
227
222
217

DRILLING LOG

DIVISION: Southwestern	INSTALLATION: N/A		Sheet 1 of 1
1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County	10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet		VERTICAL: NAVD88
	LOCATION COORDINATES: N: 1907879.76 E: 1286896.81		LOCATION METHOD:
2. HOLE NUMBER: P-25	3. DRILLING AGENCY: Terracon	11. DATE BORING: STARTED Aug 29 2024	COMPLETED Aug 29 2024
4. NAME OF DRILLER: Dakota Sloan		12. HAMMER TYPE: Automatic	EFFICIENCY (%)
5. EQUIPMENT: CME 55 Drill Rig 546		13. SIZE AND TYPE OF BIT: 3.75" HSA	
6. DIRECTION OF BORING: Vertical	DEG FROM VERTICAL: 0	BEARING:	14. ELEVATION SURFACE: 248.5'
7. THICKNESS OF OVERBURDEN: 10.0'			15. ELEVATION GROUND WATER:
8. DEPTH DRILLED INTO ROCK			16. TOTAL NUMBER CORE BOXES:
9. TOTAL DEPTH OF BORING: 10.0'			17. SIGNATURE AND TITLE OF INSPECTOR: JB

ELEV	DEPTH	BLOWS/ 0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
247.81	0.70				Asphalt, 8 inches										
		6			SANDY SILT WITH GRAVEL (ML) light gray, FILL										
		9	17				S-1			68			15		
246.01	2.50	8													
		3			LEAN CLAY WITH SAND (CL) light gray and reddish brown, medium stiff to hard, with sand seams										
		2	5				S-2								
		3													
		4													
		12	24				S-3								
		12													
		10													
		12	26				S-4								
		14													
		14													
		20	60				S-5								
		40													
		45													
238.01	10.50				Borehole finished at 10.0										

244
239
234
229
224
219

DRILLING LOG

DIVISION: Southwestern	INSTALLATION: N/A		Sheet 1 of 1
1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County	10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet		VERTICAL: NAVD88
	LOCATION COORDINATES: N: 1907913.14 E: 1286941.48		LOCATION METHOD:
2. HOLE NUMBER: P-26	3. DRILLING AGENCY: Terracon	11. DATE BORING: STARTED Aug 29 2024	COMPLETED Aug 29 2024
4. NAME OF DRILLER: Dakota Sloan	12. HAMMER TYPE: Automatic		EFFICIENCY (%)
5. EQUIPMENT: CME 55 Drill Rig 546	13. SIZE AND TYPE OF BIT: 3.75" HSA		
6. DIRECTION OF BORING: Vertical / DEG FROM VERTICAL: 0 / BEARING:	14. ELEVATION SURFACE: 248.5'		
7. THICKNESS OF OVERBURDEN: 10.0'	15. ELEVATION GROUND WATER:		
8. DEPTH DRILLED INTO ROCK:	16. TOTAL NUMBER CORE BOXES:		
9. TOTAL DEPTH OF BORING: 10.0'	17. SIGNATURE AND TITLE OF INSPECTOR: JB		

ELEV	DEPTH	BLOWS/ 0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
247.81	0.70				Asphalt, 8 inches										
247.51	1.00				LEAN CLAY WITH GRAVEL (CL) light gray, FILL										
		3			LEAN CLAY WITH SAND (CL) light gray and reddish brown,										
		3	7		medium stiff to hard, with sand seams		S-1								
		4													
		7													
		5	9				S-2								
		4													
		3													
		2	6				S-3								
		4													
		14													
		19	33				S-4								
		14													
		12													
		12	26				S-5								
		14													
		12													
		14	30				S-6								
238.51	10.00	16			Borehole finished at 10.0										

244
239
234
229
224
219

DRILLING LOG

DIVISION: Southwestern	INSTALLATION: N/A		Sheet 1 of 1
1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County	10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet		VERTICAL: NAVD88
	LOCATION COORDINATES: N: 1907932.36 E: 1286995.07		LOCATION METHOD:
2. HOLE NUMBER: P-27	3. DRILLING AGENCY: Terracon	11. DATE BORING: STARTED Aug 29 2024	COMPLETED Aug 29 2024
4. NAME OF DRILLER: Dakota Sloan	12. HAMMER TYPE: Automatic		EFFICIENCY (%)
5. EQUIPMENT: CME 55 Drill Rig 546	13. SIZE AND TYPE OF BIT: 3.75" HSA		
6. DIRECTION OF BORING: Vertical; DEG FROM VERTICAL: 0; BEARING:	14. ELEVATION SURFACE: 247.6'		
7. THICKNESS OF OVERBURDEN: 10.0'	15. ELEVATION GROUND WATER:		
8. DEPTH DRILLED INTO ROCK:	16. TOTAL NUMBER CORE BOXES:		
9. TOTAL DEPTH OF BORING: 10.0'	17. SIGNATURE AND TITLE OF INSPECTOR: JB		

ELEV	DEPTH	BLOWS/0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
246.82	0.80				Asphalt, 9 inches										
246.62	1.00	8			LEAN CLAY WITH GRAVEL (CL) light gray, FILL										
		12	28		SILT WITH SAND (ML) gray, very stiff to hard		S-1								
		16													
		6													
		6	16				S-2								
		10													
		10													
		10	22				S-3						14		
		12													
		20													
		28	58				S-4								
		30													
		8													
		10	18				S-5								
		8													
		8													
		10	22				S-6								
237.62	10.00	12			Borehole finished at 10.0										

243
238
233
228
223
218

DRILLING LOG

DIVISION: Southwestern
INSTALLATION: N/A
Sheet 1 of 1

1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County
10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet
VERTICAL: NAVD88
LOCATION COORDINATES: N: 1907052.03 E: 1286640.36
LOCATION METHOD:
2. HOLE NUMBER: D-1
3. DRILLING AGENCY: Terracon
11. DATE BORING: STARTED Aug 26 2024; COMPLETED Aug 26 2024
4. NAME OF DRILLER: Dakota Sloan
12. HAMMER TYPE: Automatic
EFFICIENCY (%):
5. EQUIPMENT: CME 55 Drill Rig 546
13. SIZE AND TYPE OF BIT: 3.75" HSA
6. DIRECTION OF BORING: Vertical; DEG FROM VERTICAL: 0; BEARING:
14. ELEVATION SURFACE: 243.6'
15. ELEVATION GROUND WATER:
7. THICKNESS OF OVERBURDEN: 10.0'
16. TOTAL NUMBER CORE BOXES:
8. DEPTH DRILLED INTO ROCK:
17. SIGNATURE AND TITLE OF INSPECTOR: DT
9. TOTAL DEPTH OF BORING: 10.0'

ELEV	DEPTH	BLOWS/0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
					SILTY SAND (SM) brown and gray, dense										
		14 17 19	36				S-1								
		13 16 31	47				S-2								
		50	50/5"				S-3								
		19 32 37	69				S-4			35			6		
		21 14 24	38				S-5								
		21 21 17	38				S-7								
233.59	10.00	15			Borehole finished at 10.0										

239 234 229 224 219 214

Boring Designation **D-2**

DRILLING LOG

DIVISION: Southwestern	INSTALLATION: N/A		Sheet 1 of 1
1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County	10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet		VERTICAL: NAVD88
	LOCATION COORDINATES: N: 1907096.66 E: 1286720.07		LOCATION METHOD:
2. HOLE NUMBER: D-2	3. DRILLING AGENCY: Terracon	11. DATE BORING: STARTED Aug 26 2024	COMPLETED Aug 26 2024
4. NAME OF DRILLER: Dakota Sloan		12. HAMMER TYPE: Automatic	EFFICIENCY (%)
5. EQUIPMENT: CME 55 Drill Rig 546		13. SIZE AND TYPE OF BIT: 3.75" HSA	
6. DIRECTION OF BORING: Vertical	DEG FROM VERTICAL: 0	BEARING:	14. ELEVATION SURFACE: 242.7'
			15. ELEVATION GROUND WATER: 231.7'
7. THICKNESS OF OVERBURDEN: 20.5'			16. TOTAL NUMBER CORE BOXES
8. DEPTH DRILLED INTO ROCK			17. SIGNATURE AND TITLE OF INSPECTOR: DT
9. TOTAL DEPTH OF BORING: 20.5'			

ELEV	DEPTH	BLOWS/0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
					SILTY SAND (SM) brown and gray, medium dense, trace clay										
		9													
		11	22				S-1								
240.74	2.00	11													
		5			SANDY LEAN CLAY (CL) brown, stiff to very stiff										
		6	13				S-2								
		7													
		5													
		8	24				S-3			66			15		
237.74	5.00	16													238
		25			CLAYEY SAND (SC) brown, very dense										
		50	50/4"				S-4								
		50	50/5"				S-5								
234.74	8.00														
		6			SANDY LEAN CLAY (CL) brown, stiff to very stiff										
		8	15				S-6								
		7													
							ST-1								233
231.24	11.50														
		4			SILTY SAND (SM) brown and gray, medium dense										
		6	14				S-7								
		8													
		3													
		4	10				S-8								
		6													
		7													
		8	17				S-9			17	NP	NP	19		228
		9													
		6													
		8	17				S-10								
		9													
		8													
		10	22				S-11								
		12													
		8													
		10	22				S-12								
222.24	20.50	12													223
					Borehole finished at 20.5										
															218
															213

DRILLING LOG

DIVISION: Southwestern	INSTALLATION: N/A		Sheet 1 of 1
1. PROJECT: Pine Bluff Arsenal Access Control Point, Jefferson County	10. COORDINATE SYSTEM: NAD 1983 StatePlane Arkansas South FIPS 0302 Feet		VERTICAL: NAVD88
	LOCATION COORDINATES: N: 1907140.87 E: 1286804.06		LOCATION METHOD:
2. HOLE NUMBER: D-3	3. DRILLING AGENCY: Terracon	11. DATE BORING: STARTED Aug 26 2024	COMPLETED Aug 26 2024
4. NAME OF DRILLER: Dakota Sloan		12. HAMMER TYPE: Automatic	EFFICIENCY (%)
5. EQUIPMENT: CME 55 Drill Rig 546		13. SIZE AND TYPE OF BIT: 3.75" HSA	
6. DIRECTION OF BORING: Vertical	DEG FROM VERTICAL: 0	BEARING:	14. ELEVATION SURFACE: 244.2'
7. THICKNESS OF OVERBURDEN: 11.0'			15. ELEVATION GROUND WATER:
8. DEPTH DRILLED INTO ROCK			16. TOTAL NUMBER CORE BOXES:
9. TOTAL DEPTH OF BORING: 11.0'			17. SIGNATURE AND TITLE OF INSPECTOR: DT

ELEV	DEPTH	BLOWS/0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	LABORATORY: Gravel	Sand	Fines	LL	PI	MC	ASTM Class	REMARKS
					LEAN CLAY (CL) brown, very stiff to hard										
		10 11 14	25				S-1								
		17 18 20	38				S-2			80			11		
		25 25 27	52				S-3								
239.20	5.00														
		38 50	50/5"		LEAN CLAY WITH SAND (CL) brown, hard		S-4								
		18 24 18	42				S-5								
236.20	8.00														
		13 12 15	27		SILTY SAND (SM) brown and gray, medium dense		S-6			32			18		
		8 9 8	17				S-7								
233.20	11.00														
					Borehole finished at 11.0										

240 235 230 225 220 215

APPENDIX B: GENERALIZED SUBSURFACE PROFILES

Project Id: HANA (64707) 005-SWL-PACP

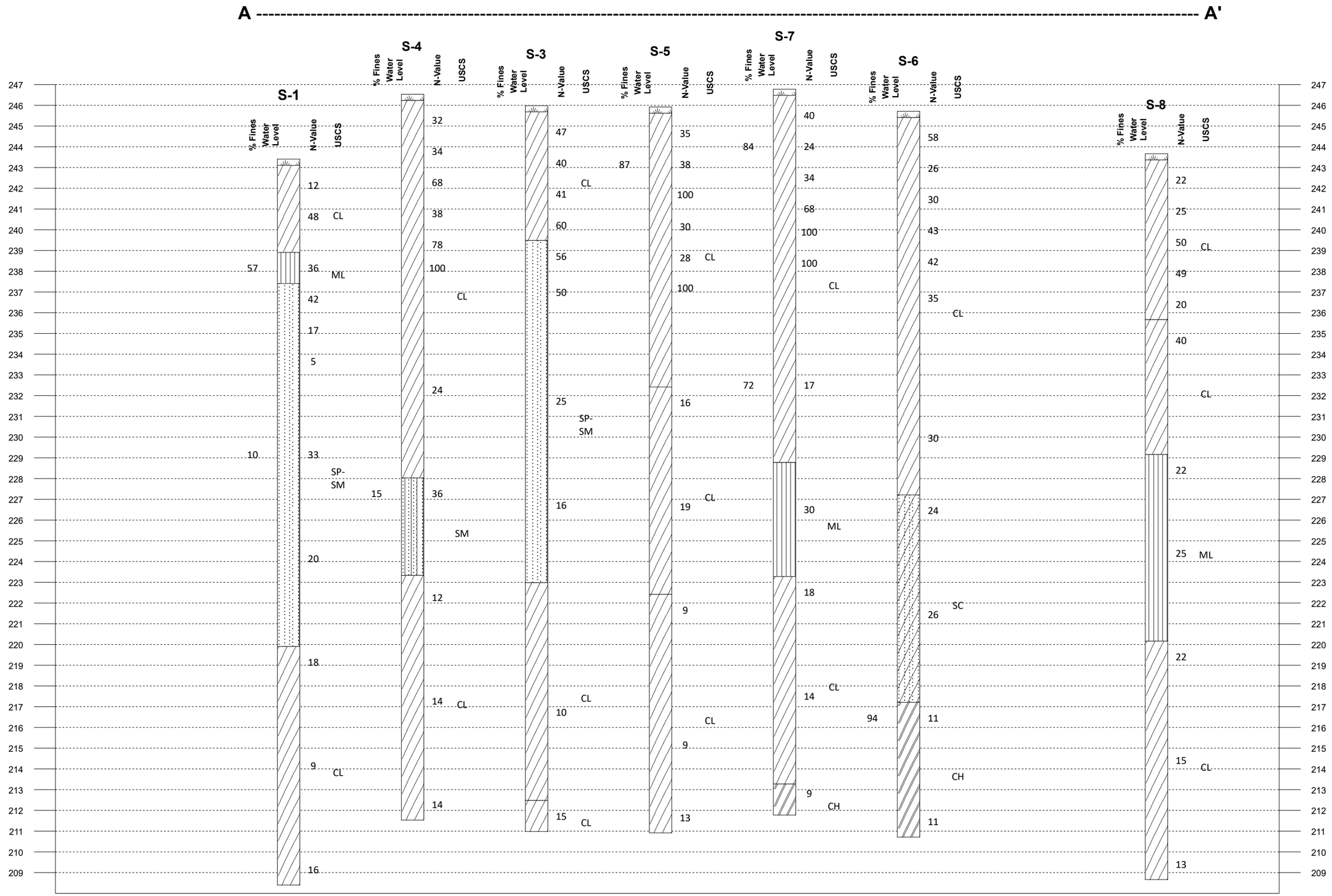
Project Title: Pine Bluff Arsenal Access Control Point

Location: Jefferson County

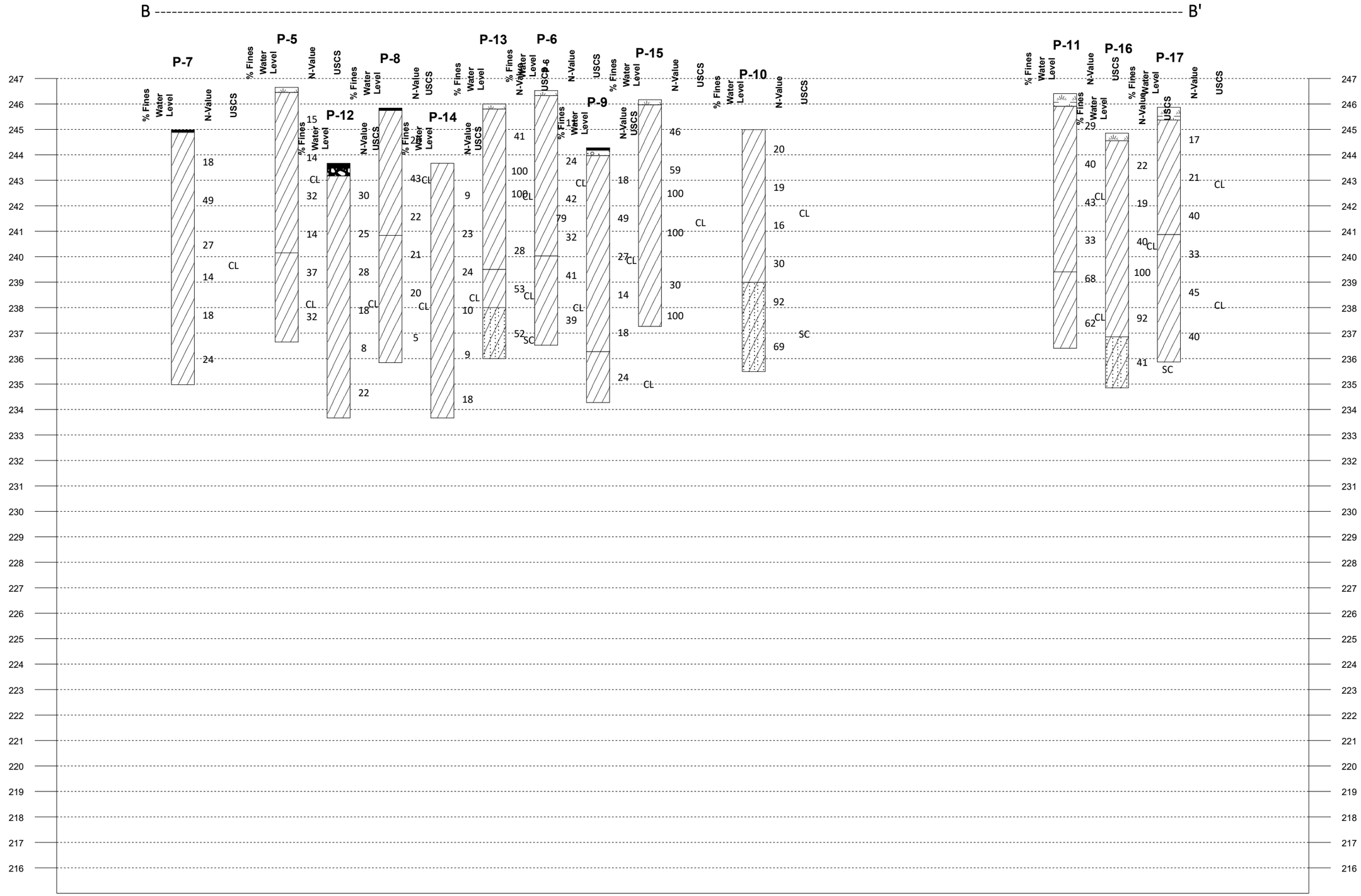
Title: Section A - A'

Vertical Scale: 1:54

Horizontal Scale: Not to scale



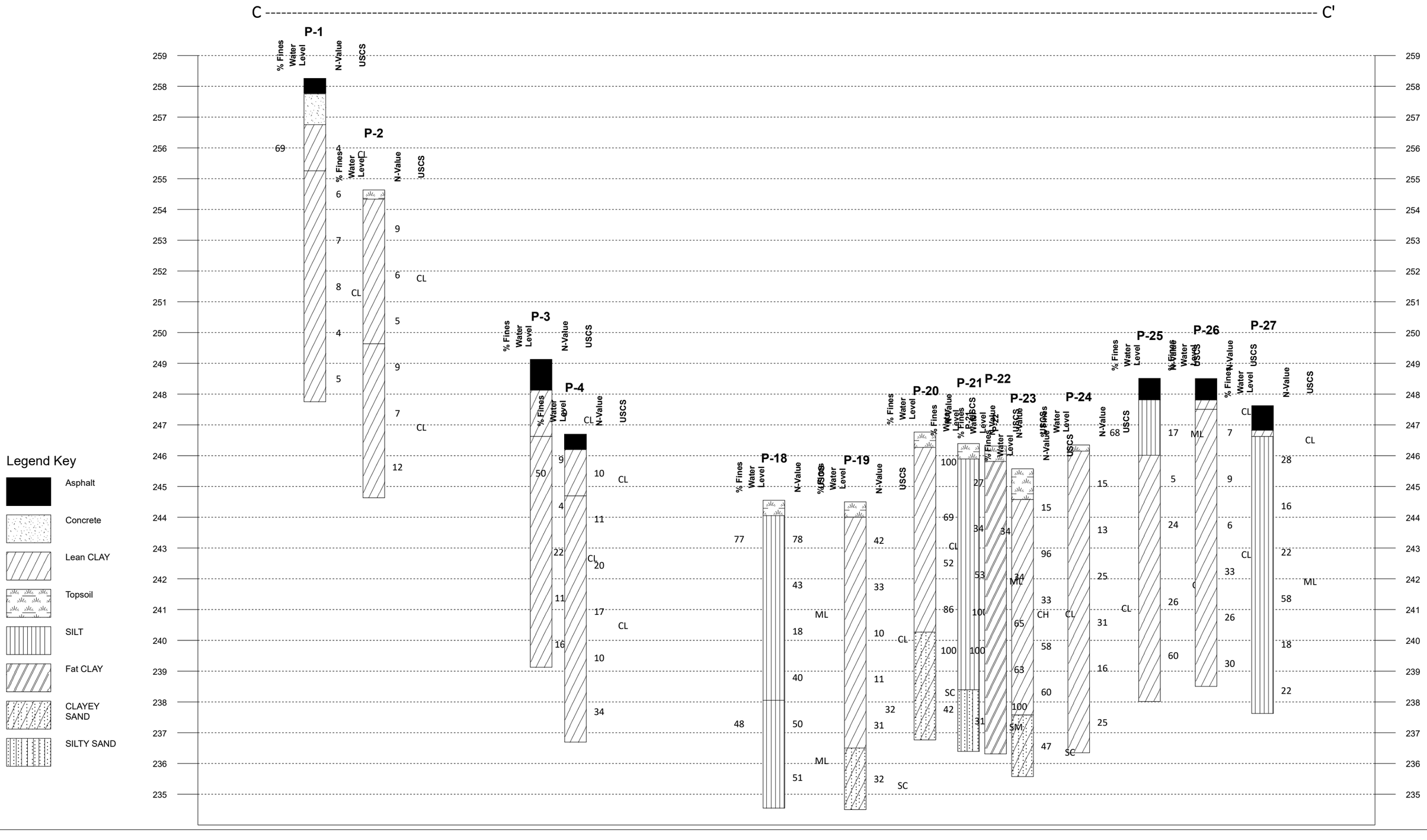
Project Id:	HANA 64707 (005-SWL-PACP)	Title:	Section B - B'
Project Title:	Pine Bluff Arsenal Access Control Point	Vertical Scale:	1:45
Location:	Jefferson County	Horizontal Scale:	Not to scale



Legend Key

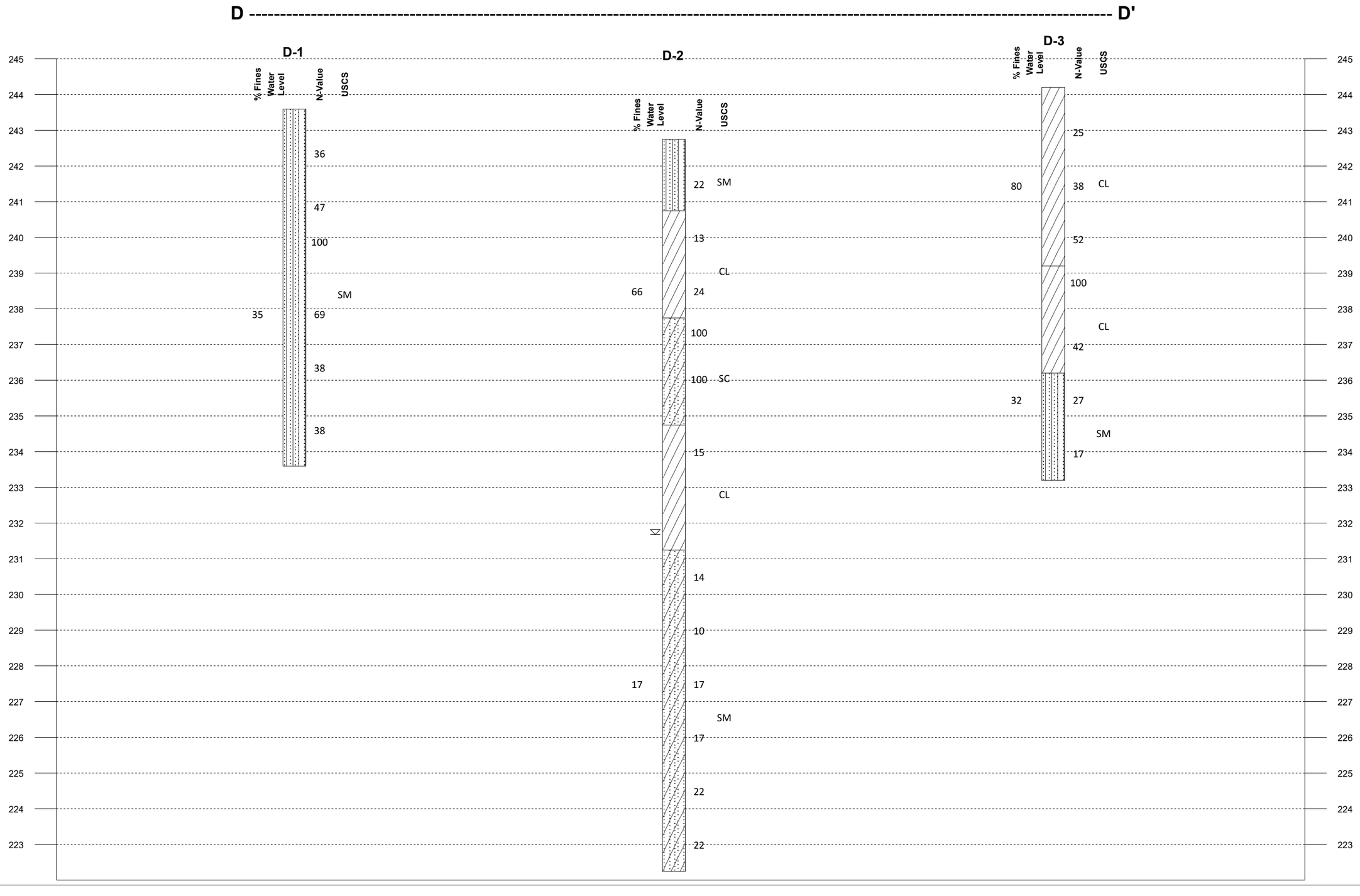
- Topsoil
- Lean CLAY
- Asphalt
- Gravel or Conglomer… 1
- Boulders & Cobbles
- CLAYEY SAND

Project Id:	HANA 64707 (005-SWL-PACP)	Title:	Section C - C'
Project Title:	Pine Bluff Arsenal Access Control Point	Vertical Scale:	1:35
Location:	Jefferson County	Horizontal Scale:	1:1060



Project Id: HANA 64707 (005-SWL-PACP)
Project Title: Pine Bluff Arsenal Access Control Point
Location: Jefferson County
Client: USACE

Title: Section D - D'
Vertical Scale: 1:32
Horizontal Scale: Not to scale



APPENDIX C: LABORATORY SUMMARIES AND PLOTS

Project No. 64707
Name PBA Access Control Point

LABORATORY INDEX TESTING SUMMARY

BORING NO.	SAMPLE NO.	TOP DEPTH (ft)	MOISTURE CONTENT	ATTERBERG LIMITS	% FINES, minus 200 sieve	USCS
S-1	S1	0.5	23	-	-	CL
	S3	4.5	13	NP	57	ML
	S7	13.5	10	NP	10	SP-SM
S-3	S1	0.5	-	28/15/13	-	CL
	S6	8.0	6	NP	-	SP-SM
	S9	28.5	23	39/16/23	-	CL
S-4	S3	3.5	10	-	-	CL
	S8	18.5	4	NP	15	SM
S-5	S2	2.0	7	28/17/11	87	CL
	S7	13.5	12	-	-	CL
S-6	S6	8.0	8	34/12/22	-	CL
	ST-1	14.0	12	39/11/28	-	CL
	S10	28.5	-	65/17/48	94	CH
S-7	S2	2.0	12	-	84	CL
	S4	5.0	7	34/18/16	-	CL
	S7	13.5	15	42/14/28	72	CL
	ST-1	18.0	15	18/17/1	-	ML
S-8	S2	2.0	-	38/17/21	-	CL
	ST-1	14.0	14	21/13/8	-	CL
	S7	14.5	12	NP	-	ML
P-1	S1	1.5	16	-	69	CL
P-3	S2	2.5	17	-	-	CL
P-4	S1	0.5	11	-	50	CL
P-5	S5	6.5	19	-	-	CL
P-7	S1	0.5	22	30/18/12	-	CL
P-9	S2	2.0	13	-	79	CL
P-12	S1	0.5	15	33/16/17	-	CL
P-15	S2	2.0	11	40/16/24	-	CL
P-18	S1	0.5	6	-	77	ML
	S5	5.5	15	-	48	SM
P-20	S5	6.5	5	-	-	SC
	S6	8.0	-	-	32	SC
P-21	S1	0.5	6	-	-	ML
P-22	S2	2.0	9	56/17/39	-	CH
P-25	S1	0.5	15	-	68	ML
P-27	S3	4.0	14	-	-	ML
D-1	S4	5.0	6	-	35	SM
D-2	S3	3.5	15	-	66	CL
	S9	14.5	19	NP	17	SM
D-3	S2	2.0	11	-	80	CL
	S6	8.0	18	-	32	SM

CHEMICAL LABORATORY TEST REPORT

Project Number: 35245003
Service Date: 09/11/24
Report Date: 09/12/24

10400 State Highway 191
Midland, Texas 79707
432-684-9600

Client

Hana Engineers & Consultants LLC
7501 Boulders View Dr, Ste 620
Richmond, VA 23225

Project

Access Control Point Pine Bluff Arsenal
Hoadley Road
White Hall, Arkansas

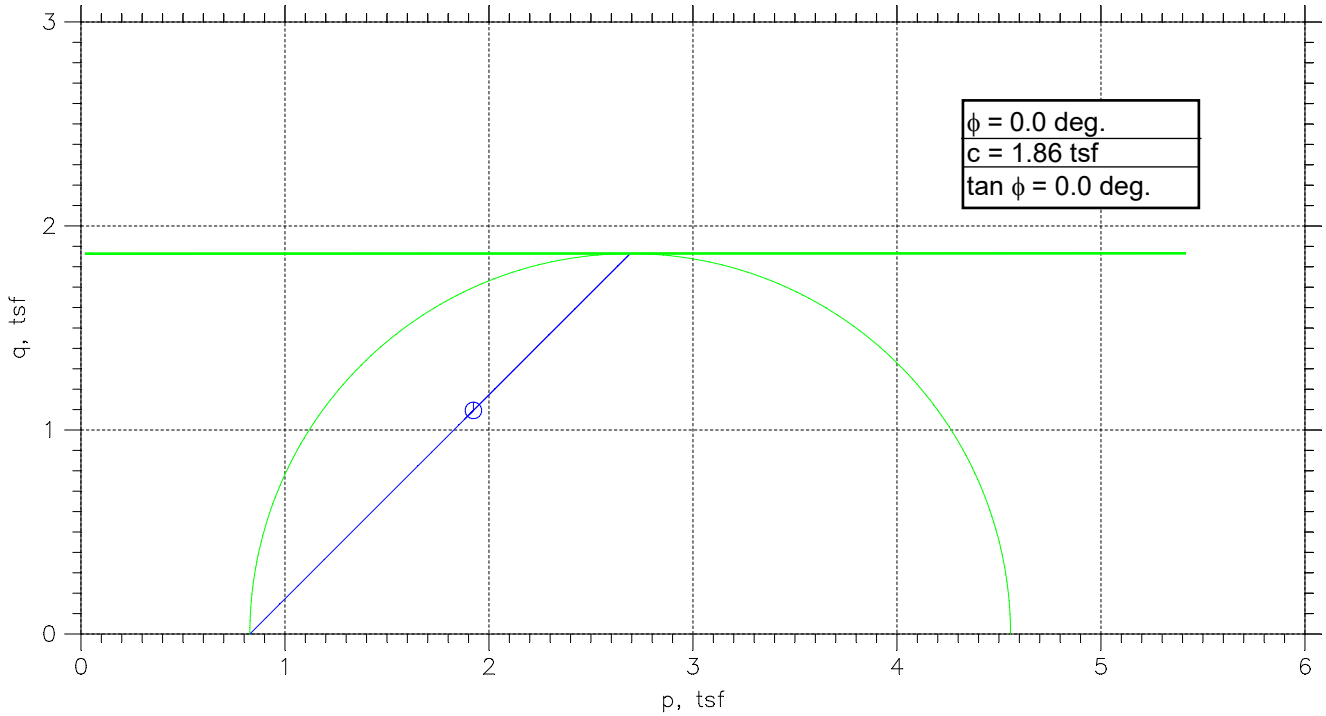
Sample Location	BULK-1
Sample Depth (ft.)	No Depth
pH Analysis, ASTM G51-18	7.3
Water Soluble Sulfate (SO4), ASTM C1580 (mg/kg)	18
Sulfides, AWWA 4500-S D, (mg/kg)	nil
Chlorides, ASTM D512, (mg/kg)	69
RedOx, ASTM D1498, (mV)	+532
Total Salts, ASTM D1125-14, (mg/kg)	670
Resistivity, ASTM G187, (ohm-cm)	2,581

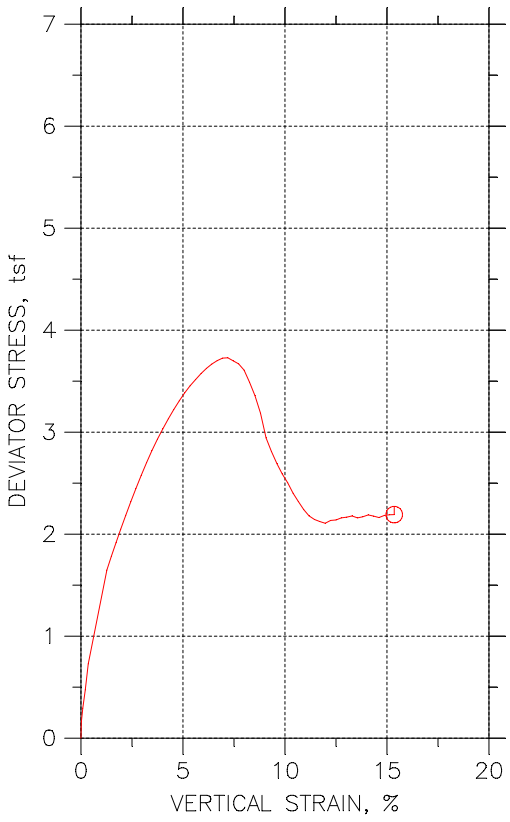
Analyzed By: Melissa Flores

Melissa Flores
Engineering Technician II

□he tests □ere performed in general accordance □ith applicable □S□M, □□SH□□, or □□□ test methods. □his report is e□clusi□el□for the use of the client indicated abo□e and shall not be reproduced e□cept in full □ithout the □ritten consent of our compan□. □est results transmitted herein are onl□applicable to the actual samples tested at the location□s□referenced and are not necessaril□indicati□e of the properties of other apparentl□similar or identical materials.

UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST
ASTM D2850





Symbol		⏲			
Test No.		11.5 PSI			
Initial	Diameter, in	2.7744			
	Height, in	6.0295			
	Water Content, %	11.61			
	Dry Density, pcf	120.23			
	Saturation, %	76.58			
	Void Ratio	0.41238			
Before Shear	Water Content, %	11.61			
	Dry Density, pcf	**120.23**			
	Saturation, %	**76.58**			
	Void Ratio	**0.41238**			
	Back Press., tsf	---			
Minor Prin. Stress, tsf		0.828			
Max. Dev. Stress, tsf		3.7288			
Time to Failure, min		7.7507			
Strain Rate, %/min		1			
B-Value		---			
Estimated Specific Gravity		2.72			
Liquid Limit		39			
Plastic Limit		11			
Plasticity Index		28			

Project: ACCESS CONTROL POINT

Location: WHITE HALL, AR

Project No.: 35245003

Boring No.: S-6 **Depth: 13.0'-15.0'**

Sample Type: 3" ST

Failure Sketch

Description: BROWN SANDY LEAN CLAY (CL)

Remarks: FAILURE CRITERIA = MAXIMUM DEVIATOR STRESS TEST PERFORMED AS PER ASTM D2850

Fri, 04-OCT-2024 16:20:43

TRIAXIAL TEST

Project: ACCESS CONTROL POINT | Location: WHITE HALL, AR | Project No.: 35245003
Boring No.: S-6 | Tested By: EEB | Checked By: WPQ
Sample No.: N/A | Test Date: 10/2/24 | Depth: 13.0'-15.0'
Test No.: 11.5 PSI | Sample Type: 3" ST | Elevation: ----

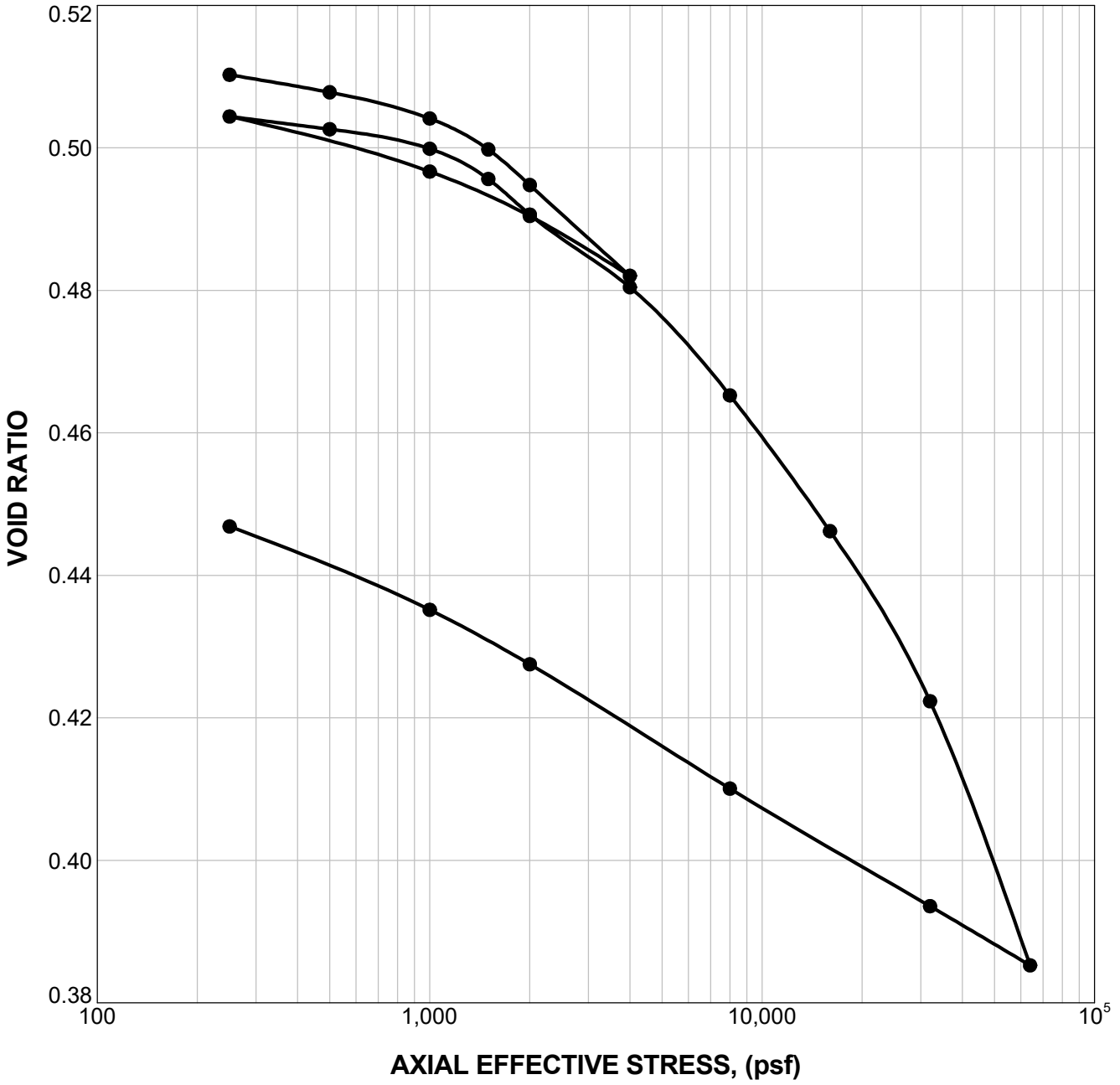
Soil Description: BROWN SANDY LEAN CLAY (CL)
Remarks: FAILURE CRITERIA = MAXIMUM DEVIATOR STRESS TEST PERFORMED AS PER ASTM D2850

Specimen Height: 6.03 in | Piston Area: 0.00 in^2 | Filter Strip Correction: 0.00 tsf
Specimen Area: 6.05 in^2 | Piston Friction: 0.00 lb | Membrane Correction: 0.00 lb/in
Specimen Volume: 36.45 in^3 | Piston Weight: 0.00 lb | Correction Type: Uniform

Liquid Limit: 39 | Plastic Limit: 11 | Estimated Specific Gravity: 2.72

	Time min	Vertical Strain %	Corrected Area in^2	Deviator Load lb	Deviator Stress tsf	Vertical Stress tsf	p tsf	q tsf
1	0	0	6.0455	0	0	0.828	0.828	0
2	0.10087	0.021496	6.0468	13.436	0.15999	0.98799	0.90799	0.079994
3	0.25223	0.090546	6.051	24.723	0.29417	1.1222	0.97509	0.14709
4	0.50032	0.21366	6.0584	39.771	0.47265	1.3007	1.0643	0.23633
5	0.75253	0.35697	6.0671	61.269	0.72709	1.5551	1.1915	0.36355
6	2.0014	1.2689	6.1232	140.14	1.6478	2.4758	1.6519	0.82392
7	2.2538	1.4885	6.1368	151.96	1.7829	2.6109	1.7195	0.89145
8	2.5023	1.7171	6.1511	163.65	1.9156	2.7436	1.7858	0.9578
9	2.7508	1.949	6.1657	175.48	2.0491	2.8771	1.8526	1.0246
10	3.0036	2.1972	6.1813	187.57	2.1848	3.0128	1.9204	1.0924
11	3.252	2.4434	6.1969	199.53	2.3183	3.1463	1.9871	1.1591
12	3.5004	2.6955	6.213	211.22	2.4477	3.2757	2.0519	1.2239
13	3.753	2.9548	6.2296	222.91	2.5763	3.4043	2.1162	1.2882
14	4.0015	3.2167	6.2464	234.33	2.701	3.529	2.1785	1.3505
15	4.2501	3.4772	6.2633	245.21	2.8188	3.6468	2.2374	1.4094
16	4.503	3.7489	6.2809	255.69	2.931	3.759	2.2935	1.4655
17	4.7512	4.0127	6.2982	265.23	3.0321	3.8601	2.344	1.516
18	5.0034	4.2811	6.3159	274.64	3.1308	3.9588	2.3934	1.5654
19	5.2516	4.5494	6.3336	283.37	3.2213	4.0493	2.4387	1.6107
20	5.5041	4.8178	6.3515	291.7	3.3067	4.1347	2.4813	1.6533
21	5.7522	5.0849	6.3694	299.49	3.3855	4.2135	2.5208	1.6928
22	6.0007	5.3481	6.3871	306.48	3.4549	4.2829	2.5554	1.7274
23	6.2529	5.6197	6.4055	312.8	3.516	4.344	2.586	1.758
24	6.5017	5.8829	6.4234	318.84	3.5739	4.4019	2.615	1.787
25	6.7541	6.1532	6.4419	324.35	3.6252	4.4532	2.6406	1.8126
26	7.0023	6.4144	6.4598	329.05	3.6676	4.4956	2.6618	1.8338
27	7.2504	6.6737	6.4778	332.95	3.7007	4.5287	2.6783	1.8503
28	7.5028	6.9427	6.4965	336.17	3.7258	4.5538	2.6909	1.8629
29	7.7507	7.2013	6.5146	337.38	3.7288	4.5568	2.6924	1.8644
30	8.0029	7.4704	6.5336	335.64	3.6987	4.5267	2.6774	1.8494
31	8.2516	7.7296	6.5519	333.89	3.6692	4.4972	2.6626	1.8346
32	8.5001	7.9954	6.5708	329.32	3.6085	4.4365	2.6323	1.8043
33	8.7528	8.2625	6.59	319.38	3.4894	4.3174	2.5727	1.7447
34	9.0012	8.5295	6.6092	308.23	3.3578	4.1858	2.5069	1.6789
35	9.2539	8.8012	6.6289	293.45	3.1873	4.0153	2.4216	1.5936
36	9.5023	9.0741	6.6488	271.81	2.9435	3.7715	2.2997	1.4717
37	9.7507	9.3373	6.6681	260.26	2.8102	3.6382	2.2331	1.4051
38	10.003	9.607	6.688	249.91	2.6905	3.5185	2.1732	1.3452
39	10.252	9.8675	6.7073	241.31	2.5904	3.4184	2.1232	1.2952
40	10.504	10.132	6.7271	233.92	2.5037	3.3317	2.0798	1.2518
41	10.752	10.395	6.7468	225.06	2.4017	3.2297	2.0289	1.2009
42	11.001	10.653	6.7663	218.07	2.3205	3.1485	1.9882	1.1602
43	11.253	10.923	6.7868	211.22	2.2408	3.0688	1.9484	1.1204
44	11.502	11.181	6.8065	205.98	2.1789	3.0069	1.9174	1.0894
45	11.754	11.449	6.8271	203.29	2.1439	2.9719	1.9	1.072
46	12.002	11.709	6.8472	201.95	2.1235	2.9515	1.8898	1.0618
47	12.25	11.972	6.8677	201.01	2.1073	2.9353	1.8817	1.0537
48	12.503	12.237	6.8884	204.23	2.1347	2.9627	1.8953	1.0673
49	12.751	12.501	6.9092	205.31	2.1395	2.9675	1.8977	1.0697
50	13.004	12.764	6.9301	207.86	2.1595	2.9875	1.9078	1.0798
51	13.252	13.029	6.9511	209.2	2.1669	2.9949	1.9115	1.0835
52	13.501	13.286	6.9718	210.95	2.1785	3.0065	1.9173	1.0893
53	13.754	13.558	6.9937	209.74	2.1593	2.9873	1.9076	1.0796
54	14.002	13.818	7.0148	211.49	2.1707	2.9987	1.9133	1.0853
55	14.25	14.083	7.0364	213.9	2.1888	3.0168	1.9224	1.0944
56	14.503	14.346	7.058	213.37	2.1766	3.0046	1.9163	1.0883
57	14.751	14.609	7.0798	212.7	2.1631	2.9911	1.9095	1.0815
58	15.004	14.874	7.1018	215.38	2.1836	3.0116	1.9198	1.0918
59	15.252	15.134	7.1236	216.73	2.1905	3.0185	1.9233	1.0953
60	15.467	15.357	7.1423	217.4	2.1915	3.0195	1.9238	1.0958

CONSOLIDATION TEST (ASTM D2435)



Natural		Initial Dry Density (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c (vr / log stress)	C_r (vr / log stress)	Initial Void Ratio
Saturation	Moisture									
80.0 %	15.1 %	112.2	18	1	2.72		7,800	0.123	0.018	0.514

MATERIAL DESCRIPTION	USCS	AASHTO
SANDY SILT	ML	A-4

NOTES:

Borehole: S-7 Depth: 18 ft Specimen #: 8

PROJECT: Access Control Point Pine Bluff Arsenal

SITE: Hoadley Road
White Hall, AR

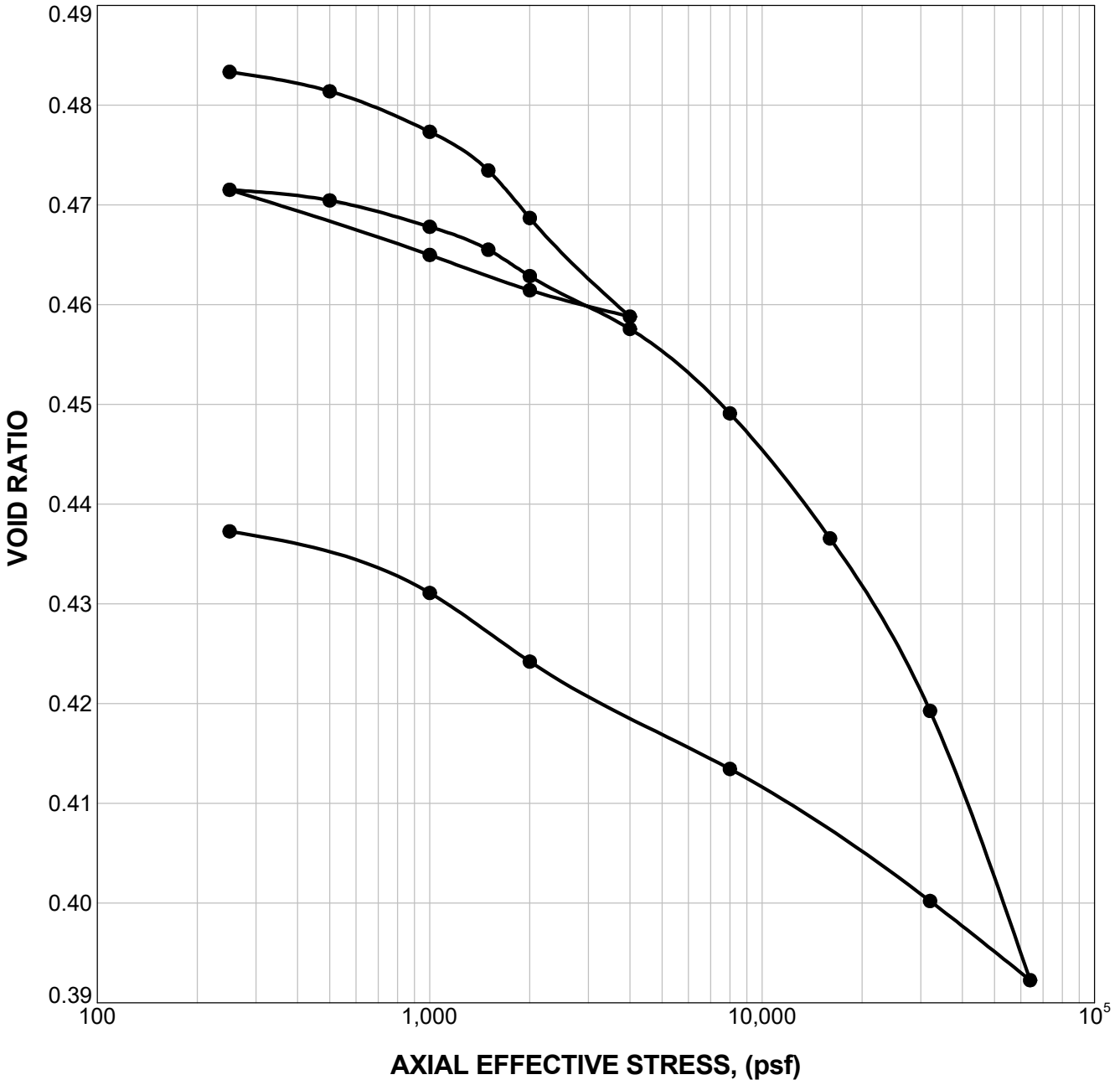
Terracon
25809 I 30
Bryant, AR

PROJECT NUMBER: 35245003

CLIENT: Hana Engineers & Consultants LLC
Richmond, VA

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CONS_LOAD-DEF_PROP_STRESS-VOIDRATIO 35245003 ACCESS CONTROL PO.GPJ TERRACON_DATATEMPLATE.GDT 10/4/24

CONSOLIDATION TEST (ASTM D2435)



Natural		Initial Dry Density (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c (vr / log stress)	C_r (vr / log stress)	Initial Void Ratio
Saturation	Moisture									
78.6 %	14.4 %	113.3	21	8	2.72		8,400	0.090	0.011	0.499

MATERIAL DESCRIPTION	USCS	AASHTO
SANDY LEAN CLAY	CL	A-4

NOTES:

Borehole: S-8 Depth: 13 ft Specimen #: 7

PROJECT: Access Control Point Pine Bluff Arsenal

SITE: Hoadley Road
White Hall, AR

Terracon
25809 I 30
Bryant, AR

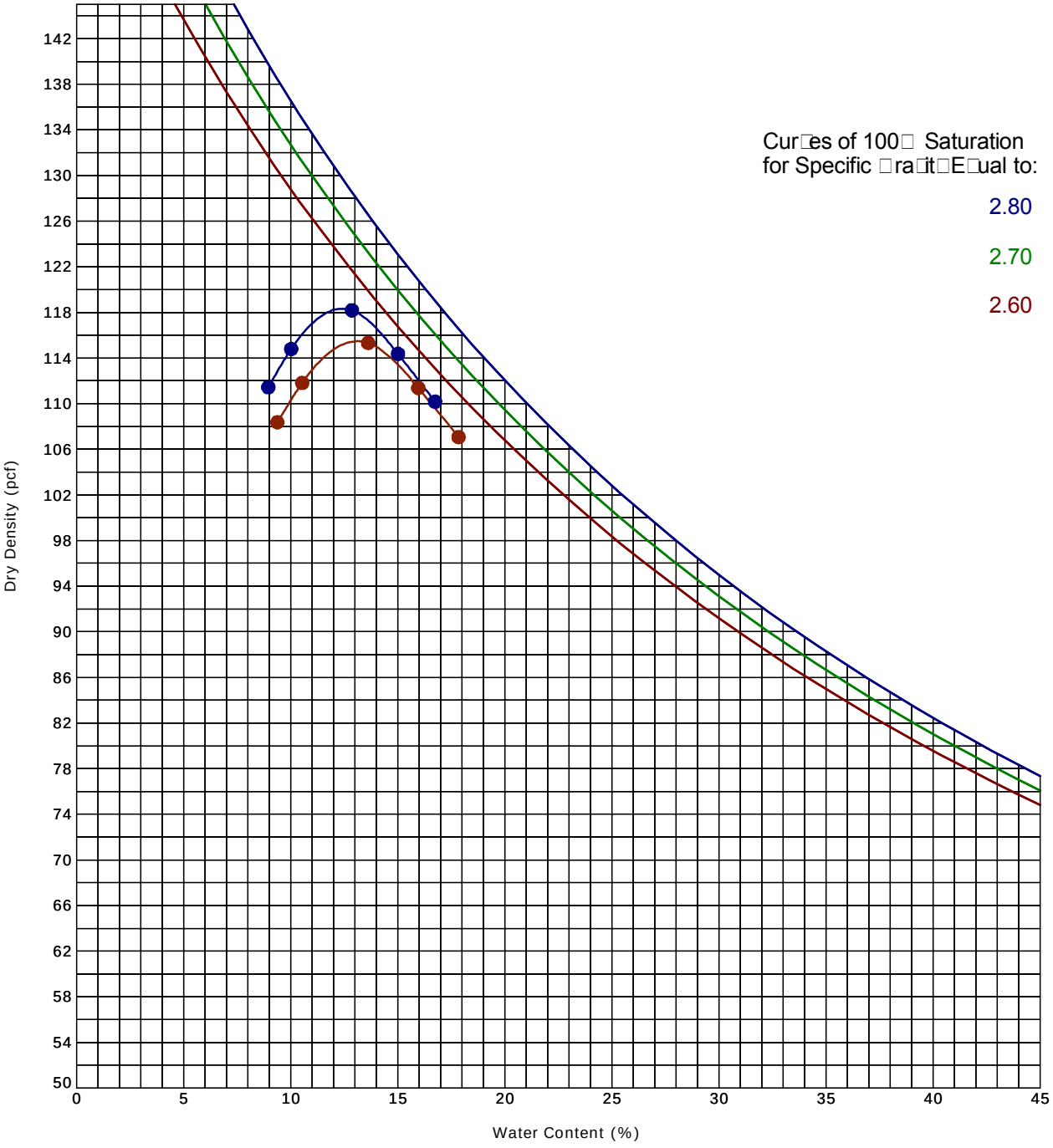
PROJECT NUMBER: 35245003

CLIENT: Hana Engineers & Consultants LLC
Richmond, VA

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CONS_LOAD-DEF_PROP_STRESS-VOIDRATIO 35245003 ACCESS CONTROL PO.GPJ TERRACON_DATATEMPLATE.GDT 10/4/24

Moisture-Density Relationship

ASTM D698-Method A

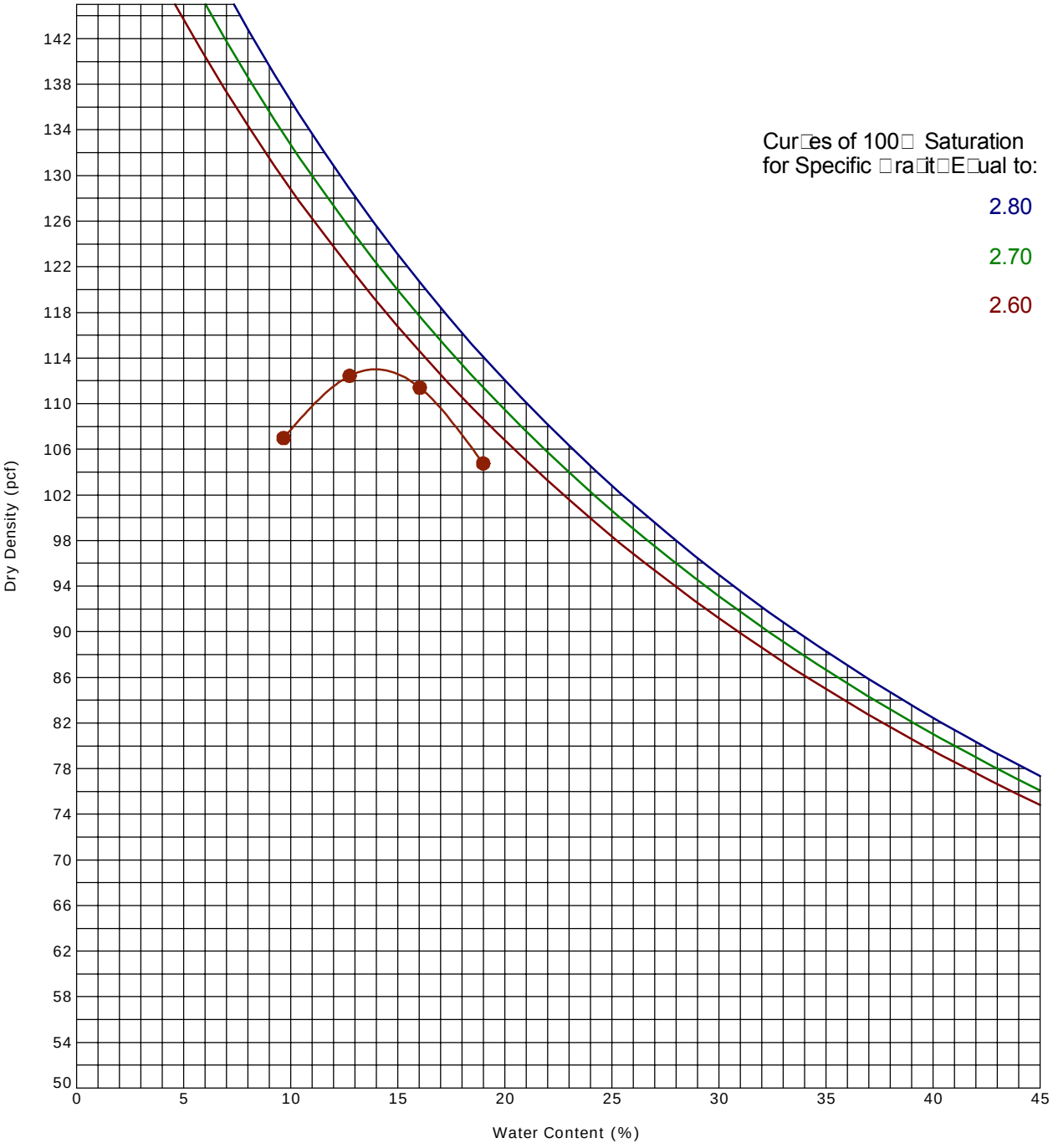


Boring ID	Depth (Ft)	Description of Materials
Bulk-1	0 - 5	LEAN CLAY with SAND(CL)

						Uncorrected		Corrected	
Fines (%)	Fraction >4.75 mm size	LL	PL	PI	Test Method	Max DD (pcf)	Optimum WC (%)	Max DD (pcf)	Optimum WC (%)
75	8.0	27	16	11	ASTM D698-Method A	115.5	13.1	118.4	12.4

Moisture-Density Relationship

ASTM D698-Method A

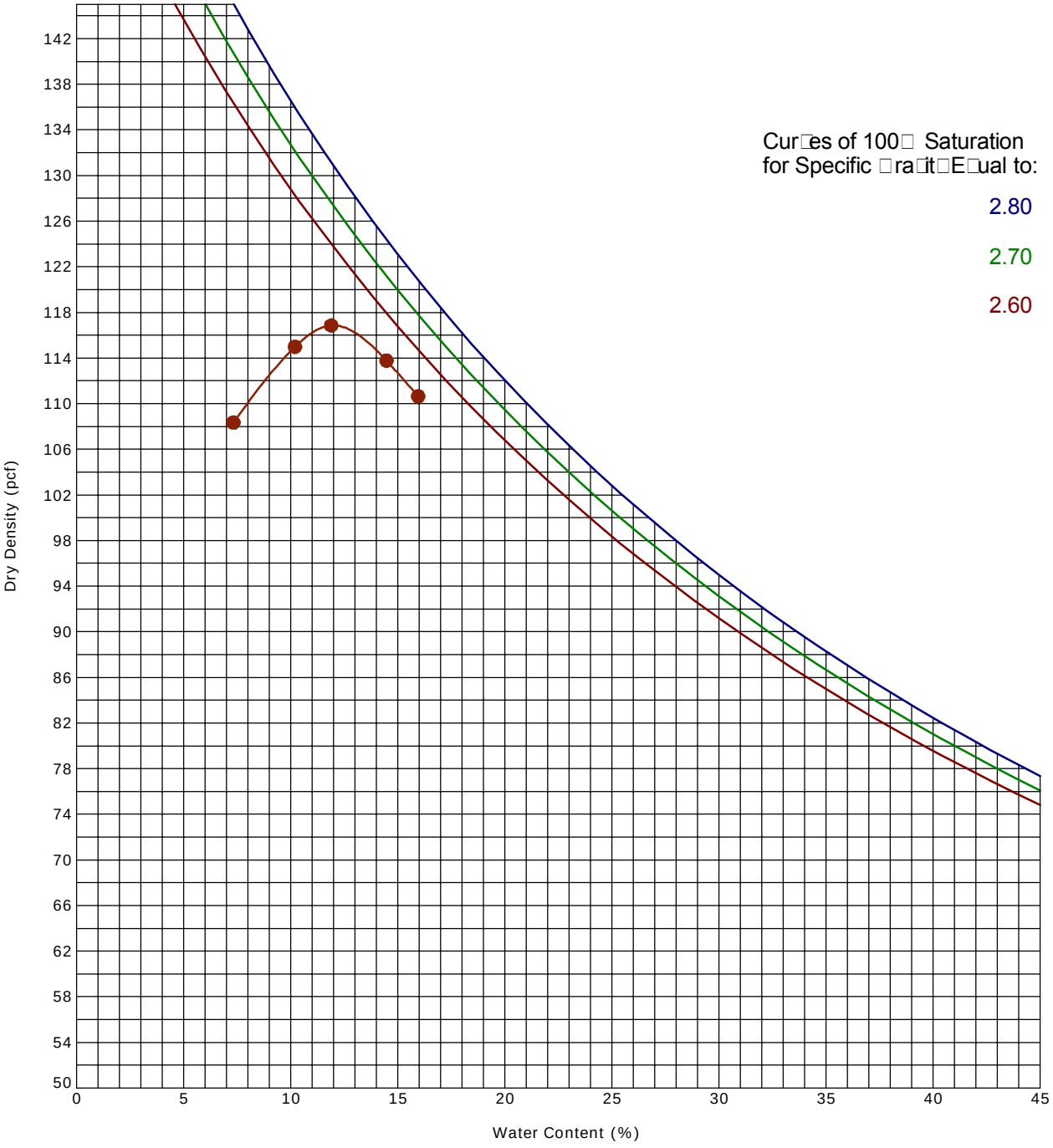


Boring ID	Depth (Ft)	Description of Materials
Bulk-2	0 - 5	LEAN CLAY with SAND(CL)

Fines (%)	Fraction > mm size	LL	PL	PI	Test Method	Maximum Dry Density (pcf)	Optimum Water Content (%)
83	0.0	28	15	13	ASTM D698-Method A	113.0	14.0

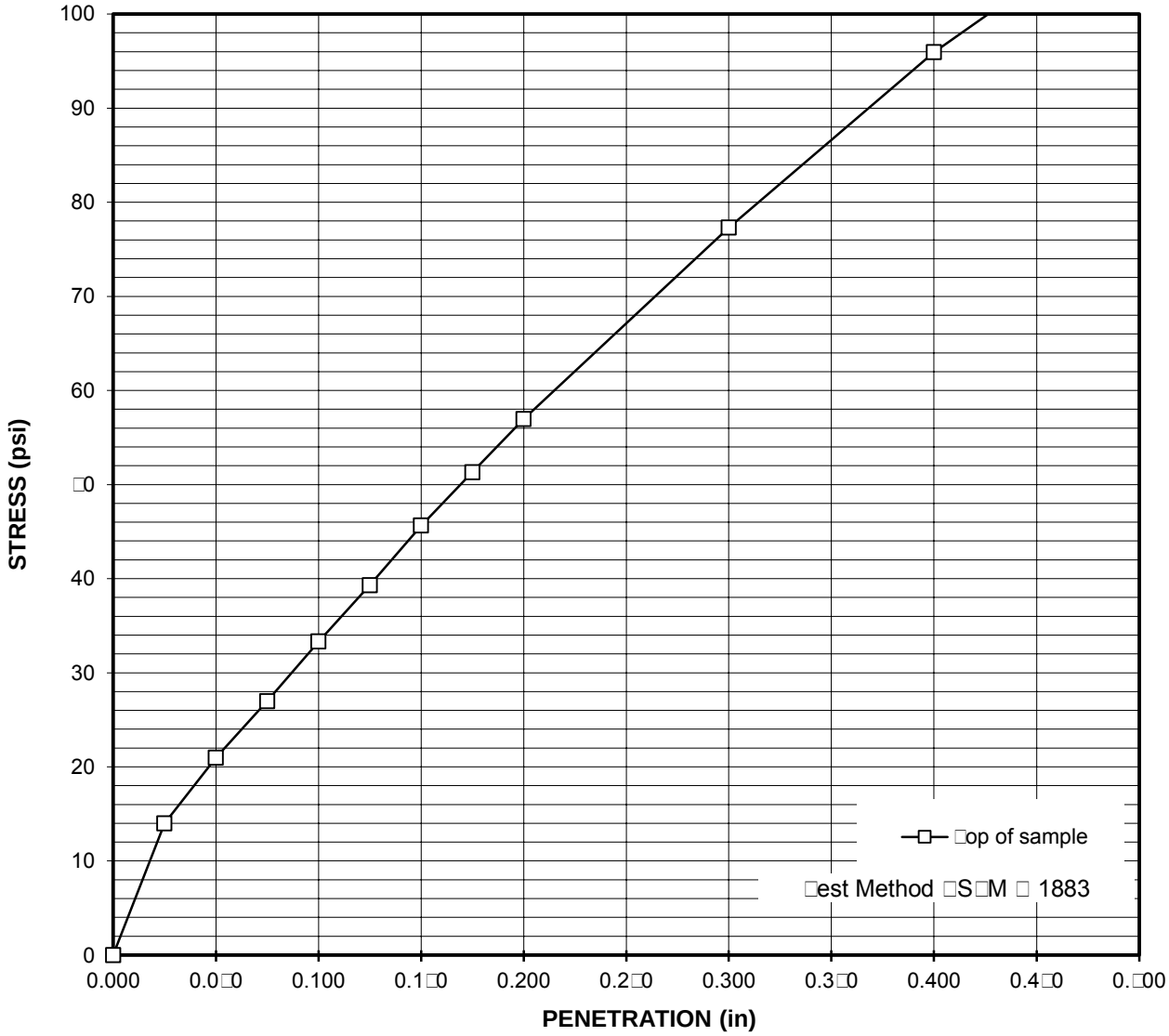
Moisture-Density Relationship

ASTM D698-Method A



Boring ID	Depth (Ft)	Description of Materials
Bulk-3	0 - 5	LEAN CLAY with SAND(CL)

Fines (%)	Fraction > mm size	LL	PL	PI	Test Method	Maximum Dry Density (pcf)	Optimum Water Content (%)
73	0.0	23	15	8	ASTM D698-Method A	116.9	12.0



TEST INFORMATION

BORING: □ulk 1

DEPTH: 0 □□ ft

SAMPLE DESCRIPTION: Lean Cla□□ith Sand CL, □li□e □ro□

TRIAL:

Surcharge Load: 10 lbs

Soaking Time: 4 da□s

LABORATORY PROPERTIES

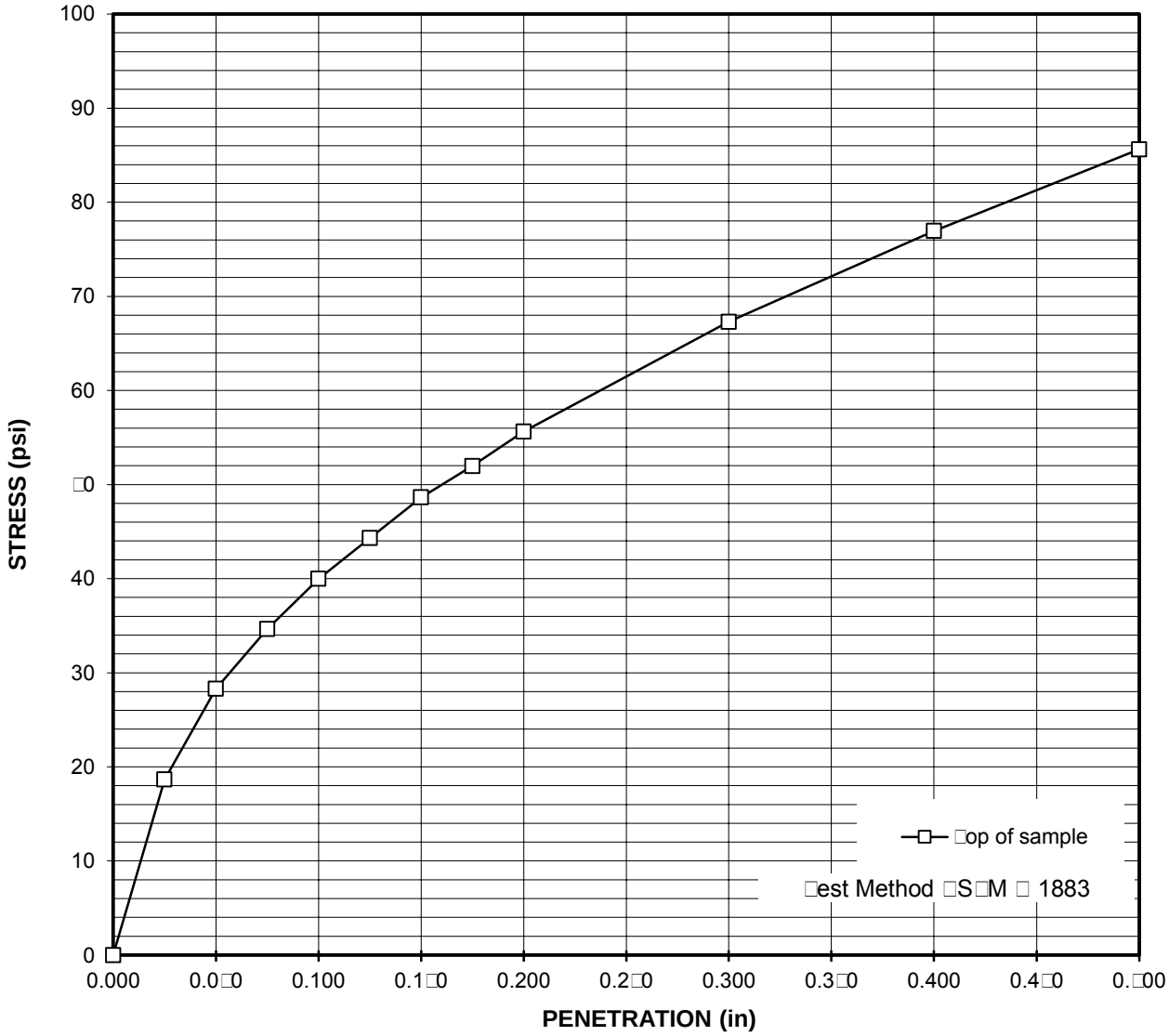
Li□uid Limit:	27
Plastic Limit:	16
Plasticit□ □nde□:	11
Minus □200 □□ □:	81

Preparation Method

□S□M □698

CBR RESULTS	
Ma□imum □r□□ensit□:	11□.□ pcf
□ptimum Moisture Content:	13.1 □
Molded □r□□ensit□:	110.4 pcf
Molding Moisture Content before soaking:	1□.6 □
Moisture Content of □op 1□ after test after soaking:	16.6 □
S□ell:	0.3 □
Soaked C□R at 0.1 inch pen.:	3.3

Project Mgr: □□ □ested b□ □S Checked b□ □ppro□ed b□	Project No. 3□24□003 Scale: N□ □ate: 9/20/2024	Terracon Consulting Engineers and Scientists 4701 North Stiles □□e □klahoma Cit□, □□ 7310□ PH: □40□□□2□04□3 □a□ □40□□□2□04□3	**CBR TEST RESULTS** **Access Control Point Pine Bluff Arsenal** **Hoadley Road** □ hite Hall, □R	**EXHIBIT**



TEST INFORMATION

BORING: □ulk 2

DEPTH: 0 □□ ft

SAMPLE DESCRIPTION: Lean Cla□□ith Sand CL, □ra□

Surcharge Load: 10 lbs

Soaking Time: 4 da□s

LABORATORY PROPERTIES

Li□uid Limit: 28

Plastic Limit: 1□

Plasticit□ □nde□: 13

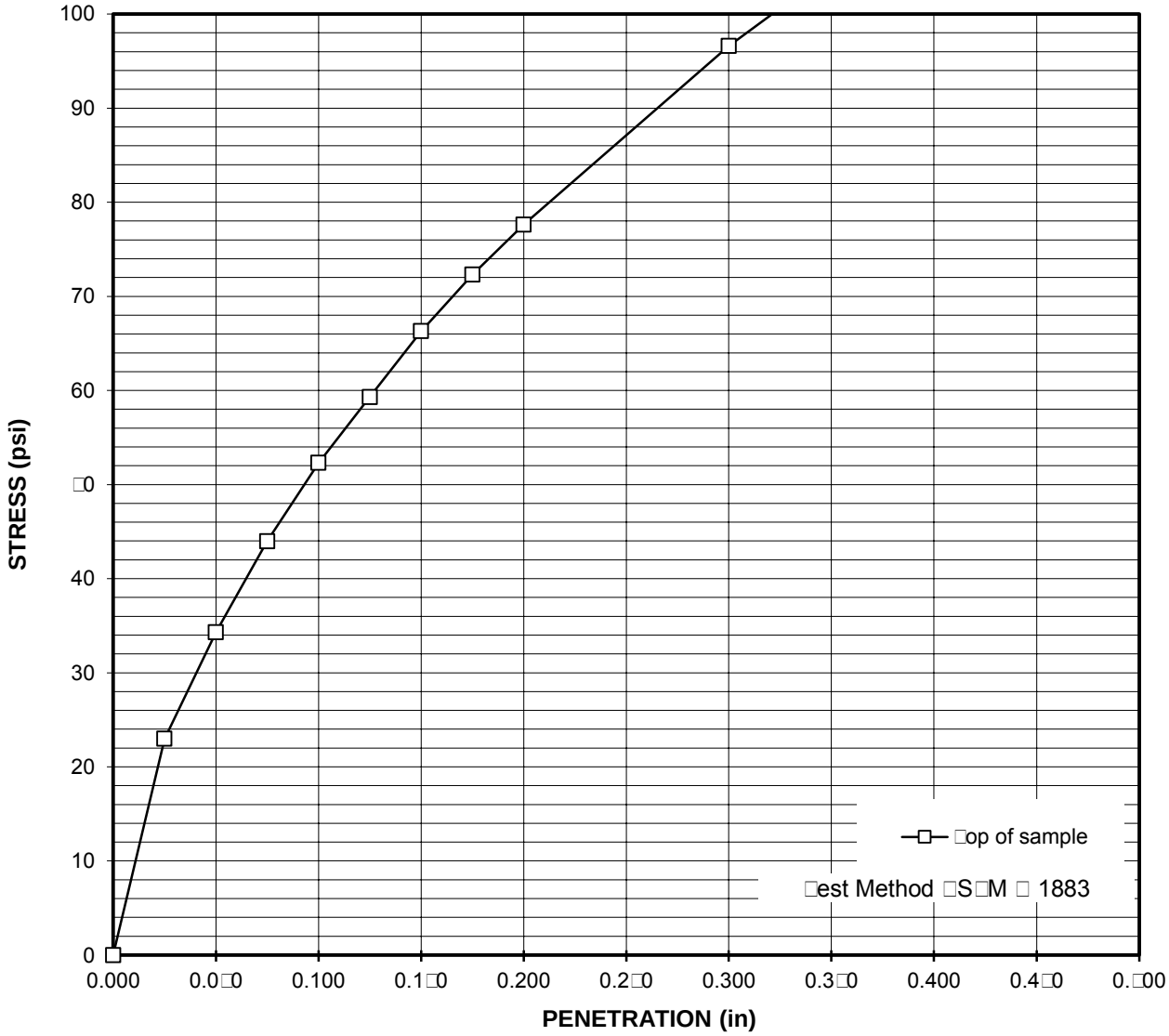
Minus □200 □□ □: 83

Preparation Method

□S□M □698

CBR RESULTS	
Ma□imum □r□□ensit□:	113.0 pcf
□ptimum Moisture Content:	14.0 □
Molded □r□□ensit□:	106.□ pcf
Molding Moisture Content before soaking:	16.1 □
Moisture Content of □op 1□ after test after soaking:	18.9 □
S□ell:	0.3 □
Soaked C□R at 0.1 inch pen.:	4.0

Project Mgr: □□ □ested b□ □S Checked b□ □ppro□ed b□	Project No. 3□24□003 Scale: N□ □ate: 9/20/2024	Terracon Consulting Engineers and Scientists 4701 North Stiles □□e □klahoma Cit□, □□ 7310□ PH: □40□□□2□04□3 □a□ □40□□□2□04□3	**CBR TEST RESULTS** **Access Control Point Pine Bluff Arsenal** **Hoadley Road** □ hite Hall, □R	**EXHIBIT**



TEST INFORMATION

BORING: □ulk 3

DEPTH: 0 □□ ft

SAMPLE DESCRIPTION: Lean Cla□ □ith Sand CL, □li□e □ro□

Surcharge Load: 10 lbs

Soaking Time: 4 da□s

LABORATORY PROPERTIES

Li□uid Limit: 23

Plastic Limit: 1□

Plasticit□ □nde□: 8

Minus □200 □□ □: 73

Preparation Method

□S□M □698

CBR RESULTS	
Ma□imum □r□ □ensit□:	116.9 pcf
□ptimum Moisture Content:	12.0 □
Molded □r□ □ensit□:	110.4 pcf
Molding Moisture Content before soaking:	14.□ □
Moisture Content of □op 1□ after test after soaking:	16.0 □
S□ell:	0.2 □
Soaked C□R at 0.1 inch pen.:	□2

Project Mgr: □□ □ested b□ □S Checked b□ □ppro□ed b□	Project No. 3□24□003 Scale: N□ □ate: 9/20/2024	Terracon Consulting Engineers and Scientists 4701 North Stiles □□e □klahoma Cit□, □□ 7310□ PH: □40 □□□2 □04□3 □a□ □40 □□□2 □04□3	**CBR TEST RESULTS** **Access Control Point Pine Bluff Arsenal** **Hoadley Road** □ hite Hall, □R	**EXHIBIT**

APPENDIX C
HAZMAT SURVEY REPORT

HAZARDOUS MATERIALS SURVEY

PINE BLUFF ARSENAL

HOADLEY ROAD
WHITE HALL, ARKANSAS 71602

ECS PROJECT NO. 49:23938

FOR: HANA ENGINEERS AND CONSULTANTS, LLC

SEPTEMBER 17, 2024

September 17, 2024

Mr. Jeff Zoeckler
Hana Engineers and Consultants, LLC
6800 Paragon Place
Suite 112
Richmond, Virginia 23230
jeff.zoeckler@hanaengineers.com

ECS Project No. 49:23938

Reference: Hazardous Materials Survey, Pine Bluff Arsenal, Hoadley Road, White Hall, Arkansas

Dear Mr. Zoeckler:

ECS Southeast, LLC (ECS) is pleased to provide Hana Engineers and Consultants, LLC with the results of the above referenced Hazardous Materials Survey performed at the Pine Bluff Arsenal located along Hoadley Road in White Hall, Arkansas. This report summarizes our observations, analytical results, findings, and recommendations related to the work performed. The work described in this report was performed by ECS in general accordance with the Scope of Services described in ECS Proposal Number 49:41735P and the terms and conditions of the agreement authorizing those services.

ECS appreciates this opportunity to provide Hana Engineers and Consultants, LLC with our services. If we can be of further assistance to you, please do not hesitate to contact us.

Sincerely,

ECS Southeast, LLC

Tal Partridge
Environmental Senior Project Manager
tpartridge@ecslimited.com
205-588-5099

Lindsey Thompson, REM
Environmental Principal
lthompson@ecslimited.com
864-987-1810

EXECUTIVE SUMMARY

The subject property is improved with a military installation located at Hoadley Road and Dayton Road in White Hall, Jefferson County, Arkansas. The facility was initially constructed in 1941, with five structures comprising four guard shacks and a metal frame canopy being the focus of this assessment. At the time of our survey, the subject buildings were occupied and are currently scheduled to be demolished.

The purpose of the survey was to determine whether asbestos-containing materials (ACMs) and/or lead-based paints are present on the subject property. The survey was performed within the interior and exterior areas of the subject buildings as well as the roof.

Asbestos Survey

On August 25, 2024, Mr. Douglas Rice, an accredited inspector, performed the asbestos assessment. Bulk samples were submitted to Scientific Analytical Institute in Greensboro, North Carolina for analysis via Polarized Light Microscopy (PLM) in accordance with the current EPA-600 methodology.

A total of 23 bulk samples from ten homogeneous areas were submitted to the laboratory, of which 23 layers were analyzed. Based on the laboratory analysis of the bulk samples collected during the survey, none of the materials were reported to contain asbestos.

The following materials were reported as non-asbestos containing:

- Joint compounds across all structures,
- Roofing materials across all structures, and
- Window glazings/sealants across all structures.

Due to inaccessibility or the destructive means that asbestos sampling requires, unseen ACMs may remain within the building hidden behind inaccessible areas, which include, but are not limited to, sub-grade walls, structural members, topping slabs, sub-grade sealants, flooring located below underlayments, areas behind exterior walls, pipe trenches, and subsurface utilities.

If suspect materials are discovered during construction activities, they should be presumed to contain asbestos and be treated as ACMs or be sampled immediately upon discovery and prior to disturbance for asbestos content by an accredited or certified asbestos inspector in accordance with 29 Code of Federal Regulations (CFR) 1926.1101.

Lead Paint Survey

The lead paint assessment was conducted by collection of paint chip samples from suspect lead paint materials. The paint chip samples were submitted to a laboratory that participates in the American Industrial Hygiene Association (AIHA) Environmental Lead Proficiency Analytical Testing (ELPAT) Programs for analysis of lead concentration (percent by weight) using Flame Atomic Absorption Spectroscopy.

Based on the laboratory analysis of the paint chips collected during the survey, the following building components were reported as lead-containing paint:

- Exterior windows and walls of the guard shacks.

Paint and surface coatings that contain detectable concentrations of lead are considered "lead-containing paints." Since OSHA has no specific action level for lead in paint, all paint on the site found to have a measurable concentration of lead should be assumed to be lead-containing. Work performed that may disturb lead-containing paint is regulated under OSHA, as referenced under 29 CFR 1926.62.

Recommendations regarding the removal and disposal of the lead paint identified during this survey can be found in Section 5.0 of this report.

The executive summary is an integral portion of this report, however, ECS recommends the report be read in its entirety.

TABLE OF CONTENTS

PAGE

1.0 SITE DESCRIPTION 1

2.0 PURPOSE 1

3.0 METHODOLOGY 1

3.1 Asbestos-Containing Materials 1

3.2 Lead in Paint and Surface Coatings 2

4.0 RESULTS 2

4.1 Asbestos Sampling 2

4.2 Suspect or Assumed Asbestos-Containing Materials 4

4.3 Lead in Paint and Surface Coatings 4

5.0 RECOMMENDATIONS AND REGULATORY REQUIREMENTS 6

5.1 Asbestos-Containing Materials 6

5.2 Lead in Paint and Surface Coatings 6

6.0 LIMITATIONS 6

TABLE OF APPENDICES

Appendix I: Figures

Appendix II: Asbestos Bulk Sample Results

Appendix III: Lead Laboratory Analytical Results

Appendix IV: Certifications/Licenses

1.0 SITE DESCRIPTION

The subject property is developed with five structures as part of the Pine Bluff Arsenal, located at Hoadley Road and Dayton Road in White Hall, Jefferson County, Arkansas. The subject property was initially developed in 1941, with the structures evaluated comprising the following;

- Buildings 24-010. 24-020, and 24-030 - Guard shacks located at the northern entrance of the facility,
- Building 24-021 - Metal frame canopy located west of building 24-020, and
- Building 24-040 - A guard shack located approximately 1/10th of a mile northeast of the guard shacks.

The structures at the facility are planned for demolition.

2.0 PURPOSE

The purpose of the Hazardous Materials Survey was to identify asbestos-containing materials (ACM) and lead paint (LP) that require special handling and/or disposal if disturbed during construction activities. The identification of ACMs requires trained labor, regulated work practices, and special disposal. The identification of LP or other lead hazards requires disclosure to contractors and monitoring of lead exposure.

3.0 METHODOLOGY

ECS performed the authorized Scope of Services in general accordance with our proposal, standard industry practice(s) and methods specified by regulation(s) for the identification of ACMs and LBPs.

3.1 Asbestos-Containing Materials

The asbestos survey was performed by Mr. Douglas Rice (AR Asbestos Inspector No. 018335) on August 25, 2024. The survey consisted of observing the accessible areas of the building for the presence of suspect materials that may contain asbestos. The survey involved detecting both friable materials (materials that can be pulverized or reduced to a powder by hand pressure when dry) and non-friable materials (materials that pose a hazard when sawn, sanded, drilled, or pulverized). Homogeneous materials (based on material type, color, texture, etc.) were identified during the survey.

The EPA National Emissions Standard for Hazardous Air Pollutants (NESHAP) requires a survey for asbestos before renovation or demolition. Demolition is defined under NESHAP as the removal of a load-bearing structural member, and renovation is an action that disturbs building materials. Based on requirements under NESHAP and the Arkansas Division of Environmental Quality (ADEQ) for renovation or demolition activities, ECS conducted a limited survey for potential ACM. The ACM survey was limited in that we did not conduct demolition, such as jack/sledgehammering, to expose potentially concealed materials. Samples were collected in general accordance with Environmental Protection Agency (EPA) Standard 40 CFR 763 Subpart E, Asbestos Hazard Emergency Response Act (AHERA), and Occupational Safety and Health Administration (OSHA) Standard 29 CFR 1926.1101 Inspection Protocol.

Representative bulk samples were collected, placed in sealed packages, and submitted to SAI for analysis using the EPA recommended method of Polarized Light Microscopy (PLM) coupled with dispersion staining (Method No. EPA 600/R-93/116). SAI participates in the National Voluntary Laboratory Accreditation Program (NVLAP). Their NVLAP accreditation number is 200664-0. Several of the samples were layered and analyzed as multiple samples. EPA regulations require collecting multiple samples of each homogeneous area for laboratory analysis. The material type, sample location, and analytical results of each bulk sample are also summarized in the attached Asbestos Bulk Analysis report in **Appendices**.

Samples were analyzed using the "Positive Stop" methodology. If one sample of a homogeneous material is reported to contain asbestos, the remaining samples are not analyzed. If one sample of a material from a homogeneous area is reported to contain greater than 1% asbestos, then by EPA definition, it is characterized as an ACM.

During the survey, ECS attempted to identify suspect ACMs in readily accessible areas. However, due to the destructive means required to identify some materials, certain areas were deemed inaccessible (i.e. behind walls or sub-grade materials) and were not surveyed for suspect ACMs.

3.2 Lead in Paint and Surface Coatings

ECS performed a lead paint screening within each of the buildings as part of our assessment activities. Representative paint chip samples were collected in each building . Samples collected were containerized, labeled, and transported to SAI. Each of the paint chip samples was subsequently analyzed for the presence of lead reported in percent lead by weight via EPA Method SW 846, 7000B (Flame AAS). The chain-of-custody, which includes sample numbers and sample locations, is included in an Appendix of this report.

4.0 RESULTS

The following is a summary of laboratory results, findings and observations.

4.1 Asbestos Sampling

In total, 23 bulk samples from ten homogeneous areas were submitted to the laboratory, of which 23 layers were analyzed.

An ACM is defined as any material containing more than one percent (>1%) asbestos as determined using the method specified in Appendix E, Subpart E, 40 CFR Part 763, Section 1, PLM. Materials are categorized by the U.S. EPA in the following categories:

- Friable ACMs are defined as any ACM that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. Non-friable ACMs are defined as any ACM that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.
- Category I non-friable ACMs include packings, gaskets, resilient floor coverings, and asphalt roofing products containing more than one percent (>1%) asbestos.
- Category II non-friable ACM are listed as any material, excluding Category I non-friable ACM, containing more than one percent (>1%) asbestos.

Regulated Asbestos Containing Materials (RACM) are friable ACM or non-friable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading or has crumbled, been pulverized, or reduced to powder in the course of renovation and/or demolition operations.

SAI submitted a signed final laboratory report to ECS on August 29, 2024. None of the bulk samples submitted for analysis were reported to contain asbestos in detectable concentrations. A complete list of the sampled materials submitted for analysis and material locations are included below. At the subject property owners request, no photographs were taken.

Asbestos Bulk Sample Locations and Analysis Results

Sample ID	Material Location	Material Description	Analytical Results	Category	Estimated Quantity
Building 24-030					
01-01 through 01-03	Walls and ceilings of structure	Joint Compound	None Detected (ND)	Not Applicable (NA)	NA
02-02, 02-02	Roof	Asphalt Roofing Shingle	ND	NA	NA
03-01, 03-02	Windows	White Window Glazing	ND	NA	NA
Building 24-020					
04-01, 04-02	Windows	White Window Glazing	ND	NA	NA
05-01, 05-02	Roof	Asphalt Roofing Shingle	ND	NA	NA
06-01 through 06-03	Walls and ceilings of structure	Joint Compound/ Primer	ND	NA	NA
Building 24-010					
07-01 through 07-03	Walls and ceilings of structure	Joint Compound/ Primer	ND	NA	NA
08-01, 08-02	Windows	White Window Glazing	ND	NA	NA

Sample ID	Material Location	Material Description	Analytical Results	Category	Estimated Quantity
09-01, 09-02	Roof	Asphalt Roofing Shingle	ND	NA	NA
Building 24-021 - No suspect materials identified					
Building 24-040					
10-01, 10-02	Exterior	Clear Window Sealant	ND	NA	NA

4.2 Suspect or Assumed Asbestos-Containing Materials

Due to the inaccessibility or the destructive means that asbestos sampling requires, additional suspect ACMs may remain within the building hidden behind inaccessible areas that include, but are not limited to, sub-grade walls, structural members, topping slabs, sub-grade sealants, flooring located below underlayments, areas behind exterior walls, pipe trenches, and subsurface utilities, etc. These areas were deemed inaccessible and were not assessed.

If these materials are discovered during construction activities, they should be presumed to contain asbestos and be treated as ACMs or be sampled immediately upon discovery and prior to disturbance for asbestos content by a certified asbestos inspector in accordance with 29 CFR 1926.1101.

Based upon our past experience in the identification of ACMs in similarly constructed buildings, the following additional suspect ACMs may also be located in inaccessible areas of the structure:

- Sub-slab sill plates.

4.3 Lead in Paint and Surface Coatings

Paint and surface coatings that contain detectable concentrations of lead are considered lead-containing paints (LCP). Since OSHA has no specific action level for lead in paint, all paint on the site found to have a measurable concentration of lead should be assumed to be lead-containing. Activities performed that may disturb LCP are regulated under OSHA, as referenced under 29 CFR 1926.62.

Lead was detected in the paint chip samples analyzed. The identified lead-containing paints are summarized in the table below. At the request of the subject property owner, no photographs were taken.

Summary Paint Chip Sampling Results

Sample ID	Location	Substrate	Component	Condition	Color	Result
Building 24-030						
LP-01	Interior	Wood	Walls	Good	Light Brown	<0.0048%
LP-02	Interior	Wood	Walls	Good	Dark Brown	0.012%
LP-03	**Exterior**	**Wood**	**Walls**	**Good**	**Dark Brown**	**5.9%**
LP-04	**Exterior**	**Wood**	**Walls**	**Good**	**Light Brown**	**5.5%**
Building 24-020						
LP-05	Interior	Wood	Walls	Good	Light Brown	<0.0056%
LP-06	Interior	Wood	Walls	Good	Dark Brown	0.73%
LP-07	**Exterior**	**Wood**	**Windows**	**Good**	**Light Brown**	**11%**
LP-08	**Exterior**	**Wood**	**Walls**	**Good**	**Dark Brown**	**11%**
Building 24-010						
LP-09	Interior	Wood	Walls	Good	Light Brown	0.012%
LP-10	Interior	Wood	Walls	Good	Dark Brown	<0.0058%
LP-11	**Exterior**	Wood	Walls	**Good**	**Light Brown**	**11%**
LP-12	**Exterior**	Wood	Walls	**Good**	**Dark Brown**	**8.8%**
Building 24-040						
LP-13	Exterior	Metal	Walls	Good	Light Brown	0.015%
Building 24-021						
LP-14	Exterior	Metal	Column	Good	Dark Brown	0.017%

5.0 RECOMMENDATIONS AND REGULATORY REQUIREMENTS

Based on our understanding of the purpose of the Hazardous Materials Survey, the results of laboratory analysis, and our findings and observations, ECS presents the following recommendations.

5.1 Asbestos-Containing Materials

None of the bulk samples submitted to Scientific Analytical Institute were reported to contain detectable concentrations of asbestos. If additional suspect asbestos-containing materials are uncovered which were not accessible during this sampling event, it is recommended that these materials be sampled or tested immediately upon discovery for asbestos content by an asbestos inspector in accordance with 29 CFR 1926.1101.

5.2 Lead in Paint and Surface Coatings

Based on the findings of the lead survey, detectable concentrations of lead were identified on some paints and surface coatings.

The presence of lead is a concern primarily when conditions exist where it may be inhaled or ingested. Regardless of the analytical results of a material, all painted and/or glazed surfaces may still contain concentrations of lead in the paint, which when disturbed, may generate lead dust greater than the Permissible Exposure Limit (PEL) of 50 micrograms per cubic meter (ug/m3) as an 8-hour Time Weighted Average (TWA) established by the OSHA "Lead Exposure in Construction Rule (29 CFR 1926.62)."

The OSHA standard gives no guidance on acceptable levels of lead in paint at which no exposure to airborne lead (above the action level) would be expected. Rather, OSHA defines airborne concentrations,, and references specific types of work practices and operations from which a lead hazard may be generated (reference 29 CFR 1926.62, section d). Environmental and personnel monitoring should be conducted during any removal/demolition process (as appropriate) to verify that actual personal exposures are below the Permissible Exposure Limit (PEL) of 50 micrograms per cubic meter ($\mu g/m^3$) as an 8-hour Time Weighted Average (TWA). Under OSHA requirements, the contractor performing renovation work will be required to conduct this monitoring and follow applicable requirements under 29 CFR 1926.62 if disturbing lead-containing paint.

6.0 LIMITATIONS

The conclusions and recommendations presented within this report are based upon a reasonable level of assessment within normal bounds and standards of professional practice for a site in this particular geographic setting. ECS is not responsible or liable for the discovery and elimination of hazards that may potentially cause damage, accidents, or injuries.

The observations, conclusions, and recommendations pertaining to environmental conditions at the subject site are necessarily limited to conditions observed, and/or materials reviewed at the time this study was undertaken. No warranty, expressed or implied, is made with regard to the conclusions and recommendations presented within this report. This report is provided for the exclusive use of the client. This report is not intended to be used or relied upon in connection with other projects or by other unidentified third parties without the written consent of ECS and the client.

Our recommendations are in part based on federal, state, and local regulations and guidelines. ECS does not assume the responsibility of the person(s) in charge of the site, or otherwise undertake responsibility for reporting to any local, state, or federal public agencies, any conditions at the site that may present a potential danger to public health, safety, or the environment. Under this scope of services, ECS assumes no responsibility regarding any response actions initiated as a result of these findings. General compliance with regulations and response actions are the sole responsibility of the Client and should be conducted in accordance with local, state, and/or federal requirements.

Appendix I: Figures

Demolitions – 5 Buildings

- 24-010
- 24-020
- 24-030
- 24-040
- 24-021

SITE
DEMOLITION

Appendix II: Asbestos Bulk Sample Results

Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and
40 CFR, Part 763, Subpart E, App.E

NVLAP LAB CODE 200664-0

Lab ID # 173190

Customer: ECS Central, PLLC
318 Seaboard Lane Suite 208
Franklin, TN 37067

Attn: Doug Rice

Project: 49-23938 Pine Bluff Armory

Lab Order ID: **10060877**
Analysis: PLM
Date Received: 08/26/2024
Date Reported: 08/29/2024

Sample ID *Lab Sample ID*	Description *Lab Notes*	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes Treatment
01-01	Joint compound/primer	**None Detected**		**100% Other**	White Non-Fibrous Homogeneous
10060877_0001					Crushed
01-02	Joint compound/primer	**None Detected**		**100% Other**	White Non-Fibrous Homogeneous
10060877_0002					Crushed
01-03	Joint compound/primer	**None Detected**		**100% Other**	White Non-Fibrous Homogeneous
10060877_0003					Crushed
02-01	Asphalt shingle	**None Detected**	**30% Fiber Glass**	**70% Other**	Black Fibrous Homogeneous
10060877_0004					Dissolved
02-02	Asphalt shingle	**None Detected**	**30% Fiber Glass**	**70% Other**	Black Fibrous Homogeneous
10060877_0005					Dissolved
03-01	Window glaze	**None Detected**		**100% Other**	White Non-Fibrous Homogeneous
10060877_0006					Dissolved, Crushed
03-02	Window glaze	**None Detected**		**100% Other**	White Non-Fibrous Homogeneous
10060877_0007					Dissolved
04-01	Window glaze	**None Detected**		**100% Other**	White Non-Fibrous Homogeneous
10060877_0008					Ashed

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogenous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Megan Javonovich (23)
Analyst

Approved Signatory

Scientific Analytical Institute, Inc. 4604 Dundas Dr. Greensboro, NC 27407 (336) 292-3888

Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and
40 CFR, Part 763, Subpart E, App.E

NVLAP LAB CODE 200664-0

Lab ID # 173190

Customer: ECS Central, PLLC
318 Seaboard Lane Suite 208
Franklin, TN 37067

Attn: Doug Rice

Project: 49-23938 Pine Bluff Armory

Lab Order ID: **10060877**
Analysis: PLM
Date Received: 08/26/2024
Date Reported: 08/29/2024

Sample ID / *Lab Sample ID*	Description / *Lab Notes*	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes / Treatment
04-02	Window glaze	**None Detected**		**100% Other**	White Non-Fibrous Homogeneous
10060877_0009					Dissolved
05-01	Asphalt shingle	**None Detected**	**30% Fiber Glass**	**70% Other**	Black Fibrous Homogeneous
10060877_0010					Dissolved
05-02	Asphalt shingle	**None Detected**	**30% Fiber Glass**	**70% Other**	Black Fibrous Homogeneous
10060877_0011					Dissolved
06-01	Joint compound/primer	**None Detected**		**100% Other**	White Non-Fibrous Homogeneous
10060877_0012					Crushed
06-02	Joint compound/primer	**None Detected**		**100% Other**	White Non-Fibrous Homogeneous
10060877_0013					Crushed
06-03	Joint compound/primer	**None Detected**		**100% Other**	White Non-Fibrous Homogeneous
10060877_0014					Crushed
07-01	Joint compound/primer	**None Detected**		**100% Other**	White Non-Fibrous Homogeneous
10060877_0015					Crushed
07-02	Joint compound/primer	**None Detected**		**100% Other**	White Non-Fibrous Homogeneous
10060877_0016					Crushed

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogenous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Megan Javonovich (23)
Analyst

Approved Signatory

Scientific Analytical Institute, Inc. 4604 Dundas Dr. Greensboro, NC 27407 (336) 292-3888

Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and
40 CFR, Part 763, Subpart E, App.E

NVLAP LAB CODE 200664-0

Lab ID # 173190

Customer: ECS Central, PLLC
318 Seaboard Lane Suite 208
Franklin, TN 37067

Attn: Doug Rice

Project: 49-23938 Pine Bluff Armory

Lab Order ID: **10060877**
Analysis: PLM
Date Received: 08/26/2024
Date Reported: 08/29/2024

Sample ID *Lab Sample ID*	Description *Lab Notes*	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes Treatment
07-03	Joint compound/primer	None Detected		100% Other	White Non-Fibrous Homogeneous
10060877_0017					Crushed
08-01	Window glaze	None Detected		100% Other	Gray Non-Fibrous Homogeneous
10060877_0018					Crushed, Dissolved
08-02	Window glaze	None Detected		100% Other	Gray Non-Fibrous Homogeneous
10060877_0019					Crushed, Dissolved
09-01	Asphalt shingle	None Detected	30% Fiber Glass	70% Other	Black, Gray Fibrous Homogeneous
10060877_0020					Dissolved
09-02	Asphalt shingle	None Detected	30% Fiber Glass	70% Other	Black, Gray Fibrous Homogeneous
10060877_0021					Dissolved
10-01	Window sealant	None Detected		100% Other	Transparent Non-Fibrous Homogeneous
10060877_0022					Ashed
10-02	Window sealant	None Detected		100% Other	Transparent Non-Fibrous Homogeneous
10060877_0023					Ashed

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogenous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Megan Javonovich (23)
Analyst

Approved Signatory

10060877

Client:	ECS Southeast LLP	***Instructions:**	***Scientific Analytical***
Contact:	Doug Rice	*Use Column "B" for your contact info*	
Address:	318 Seabord Ln, Ste 208, Franklin, TN 37067		***Institute, Inc.***
Phone:	(615) 855-4983	*To See an Example Click the bottom Example Tab.*	***4604 Dundas Dr.***
Fax:	(615) 771-4134		***Greensboro, NC 27407***
Email:	drice@ecslimited.com	***Enter samples between "<<" and ">>"***	
Project:	49-23938 Pine Bluff Armory	***Begin Samples with a "<< "above the first sample and end with a ">>" below the last sample.***	***Phone: 336.292.3888***
Client Notes:		*Only Enter your data on the first sheet "Sheet1"*	***Fax: 336.292.3313***
P.O. #.			***Email: lab@sailab.com***
Date Submitted:	8/23/2024 16:00	*Note: Data 1 and Data 2 are optional fields that do not show up on the official report, however they will be included in the electronic data returned to you to facilitate your reintegration of the report data.*	
Analysis:	PLM EPA 0600 Positive Stop		
TurnAroundTime:	3 Day TAT		

Sample Number	Location	Sample Description	Quantity
<<			
01-01	24030- Walls and ceiling	Joint compound/primer	
01-02	24030- Walls and ceiling	Joint compound/primer	
01-03	24030- Walls and ceiling	Joint compound/primer	
02-01	24030- Roof	Asphalt shingle	
02-02	24030- Roof	Asphalt shingle	
03-01	24030- Exterior	Window glaze	
03-02	24030- Exterior	Window glaze	
04-01	24020- Exterior	Window glaze	
04-02	24020- Exterior	Window glaze	
05-01	24020- Roof	Asphalt shingle	
05-02	24020- Roof	Asphalt shingle	
06-01	24020- Ceiling	Joint compound/primer	
06-02	24020- Ceiling	Joint compound/primer	
06-03	24020- Ceiling	Joint compound/primer	
07-01	24010- Ceiling	Joint compound/primer	
07-02	24010- Ceiling	Joint compound/primer	
07-03	24010- Ceiling	Joint compound/primer	
08-01	24010- Exterior	Window glaze	
08-02	24010- Exterior	Window glaze	
09-01	24010- Roof	Asphalt shingle	
09-02	24010- Roof	Asphalt shingle	
10-01	24040- Exterior	Window sealant	
10-02	24040- Exterior	Window sealant	

Accepted ☐

Rejected ☐

8/26

10:20

Appendix III: Lead Laboratory Analytical Results

Analysis for Lead Concentration in Paint Chips

by Flame Atomic Absorption Spectroscopy
EPA SW-846 3050B/6010C/7000B

Customer: ECS Central, PLLC
318 Seaboard Lane Suite 208
Franklin, TN 37067

Attn: Doug Rice

Project: 49-23938

Lab Order ID: **10060879**
Analysis: PBP
Date Received: 08/26/2024
Date Reported: 08/29/2024

Sample ID *Lab Sample ID*	Description *Lab Notes*	Mass (g)	Concentration (ppm)	Concentration (% by weight)
LP-01 *10060879_0001*	**Light Brown - 24030 Interior**	0.0836	<48	**<0.0048%**
LP-02 *10060879_0002*	**Dark Brown - 24030 Interior**	0.0928	120	**0.012%**
LP-03 *10060879_0003*	**Dark Brown - 24030 Exterior**	0.1080	59000	**5.9%**
LP-04 *10060879_0004*	**Light Brown - 24030 Exterior**	0.0717	55000	**5.5%**
LP-05 *10060879_0005*	**Light Brown - 24020 Interior**	0.0709	<56	**<0.0056%**
LP-06 *10060879_0006*	**Dark Brown - 24020 Interior**	0.0911	7300	**0.73%**
LP-07 *10060879_0007*	**Light Brown - 24020 Exterior**	0.1255	110000	**11%**
LP-08 *10060879_0008*	**Dark Brown - 24020 Exterior**	0.1345	110000	**11%**

Disclaimer: Unless otherwise noted blank sample correction was not performed on analytical results. Scientific Analytical Institute participates in the AIHA ELPAT program. ELPAT Laboratory ID: 173190. This report relates only to the samples tested and may not be reproduced, except in full, without the written approval of SAI. Analytical uncertainty available upon request. The quality control samples run with the samples in this report have passed all EPA required specifications unless otherwise noted. RL: (Report Limit for an undiluted 50ml sample is 4µg Total Pb).

Matthew Caffey (14)
Analyst

Approved Signatory

Scientific Analytical Institute, Inc. 4604 Dundas Dr. Greensboro, NC 27407 (336) 292-3888

Analysis for Lead Concentration in Paint Chips

by Flame Atomic Absorption Spectroscopy
EPA SW-846 3050B/6010C/7000B

Customer: ECS Central, PLLC
318 Seaboard Lane Suite 208
Franklin, TN 37067

Attn: Doug Rice

Project: 49-23938

Lab Order ID: **10060879**
Analysis: PBP
Date Received: 08/26/2024
Date Reported: 08/29/2024

Sample ID *Lab Sample ID*	Description *Lab Notes*	Mass (g)	Concentration (ppm)	Concentration (% by weight)
LP-09 *10060879_0009*	**Light Brown - 24010 Interior**	0.0756	120	**0.012%**
LP-10 *10060879_0010*	**Dark Brown - 24010 Interior**	0.0688	<58	**<0.0058%**
LP-11 *10060879_0011*	**Light Brown - 24010 Exterior**	0.0949	110000	**11%**
LP-12 *10060879_0012*	**Dark Brown - 24010 Exterior**	0.0997	88000	**8.8%**
LP-13 *10060879_0013*	**Light Brown - 24040**	0.0792	150	**0.015%**
LP-14 *10060879_0014*	**Dark Brown - 24021**	0.0668	170	**0.017%**

Disclaimer: Unless otherwise noted blank sample correction was not performed on analytical results. Scientific Analytical Institute participates in the AIHA ELPAT program. ELPAT Laboratory ID: 173190. This report relates only to the samples tested and may not be reproduced, except in full, without the written approval of SAI. Analytical uncertainty available upon request. The quality control samples run with the samples in this report have passed all EPA required specifications unless otherwise noted. RL: (Report Limit for an undiluted 50ml sample is 4µg Total Pb).

Matthew Caffey (14)
Analyst

Approved Signatory

Scientific Analytical Institute, Inc. 4604 Dundas Dr. Greensboro, NC 27407 (336) 292-3888

Scientific Analytical Institute
4604 Dundas Dr. Greensboro, NC 27407
Phone: 336.292.3888 Fax: 336.292.3313
www.sailab.com lab@sailab.com

Lab Use Only
Lab Order ID: 10060879
Client Code: _____

Contact Information

Company Name: ECS Southeast LLP
Address: 318 Seaboard Lane
Suite 208
Franklin TN 37067
Contact: Doug Rice
Phone ☐:
Fax ☐:
Email ☒: DRice@ECSLimited.com
PO Number:
Project Name/Number: 49-23938

Billing/Invoice Information

Company:
Address: Same as Contact
Contact:
Phone ☐:
Fax ☐:
Email ☐:

Turn Around Times

3 Hours	☐	72 Hours	☒
6 Hours	☐	96 Hours	☐
12 Hours	☐	120 Hours	☐
24 Hours	☐	144+ Hours	☐
48 Hours	☐		

Lead Test Types

Paint Chips by Flame AA (PBP) ☒	Soil by Flame AA (PBS) ☐	Other ☐
Wipe by Flame AA (PBW) ☐	Air by Flame AA (PBA) ☐	

Sample ID #	Description/Location	Volume/Area	Comments
LP-01	Light Brown - 24030 Interior	2"x2"	
LP-02	Dark Brown - 24030 Interior	2"x2"	
LP-03	Dark Brown - 24030 Exterior	2"x2"	
LP-04	Light Brown - 24030 Exterior	2"x2"	
LP-05	Light Brown - 24020 Interior	2"x2"	
LP-06	Dark Brown - 24020 Interior	2"x2"	
LP-07	Light Brown - 24020 Exterior	2"x2"	
LP-08	Dark Brown - 24020 Exterior	2"x2"	
LP-09	Light Brown - 24010 Interior	2"x2"	
LP-10	Dark Brown - 24010 Interior	2"x2"	
LP-11	Light Brown - 24010 Exterior	2"x2"	
LP-12	Dark Brown - 24010 Exterior	2"x2"	
LP-13	Light Brown - 24040	2"x2"	
LP-14	Dark Brown - 24021	2"x2"	

Accepted ☒
Rejected ☐

Total Number of Samples 14

Relinquished by	Date/Time	Received by	Date/Time
Douglas Rice	8/23/24 16:00		8/24 10:20

Appendix IV: Certifications/ Licenses

ARKANSAS DIVISION OF ENVIRONMENTAL QUALITY

ASBESTOS PROGRAM

DOUGLAS RICE

has satisfied the requirements of AHERA/ASHARA under TSCA Title II, and those of Rule 21 of the Arkansas Pollution Control and Ecology Commission, pursuant to Ark. Code Ann. § 20-27-1001 *et seq.*, and is hereby certified to perform certain asbestos-related work, within the State of Arkansas, in the following discipline(s):

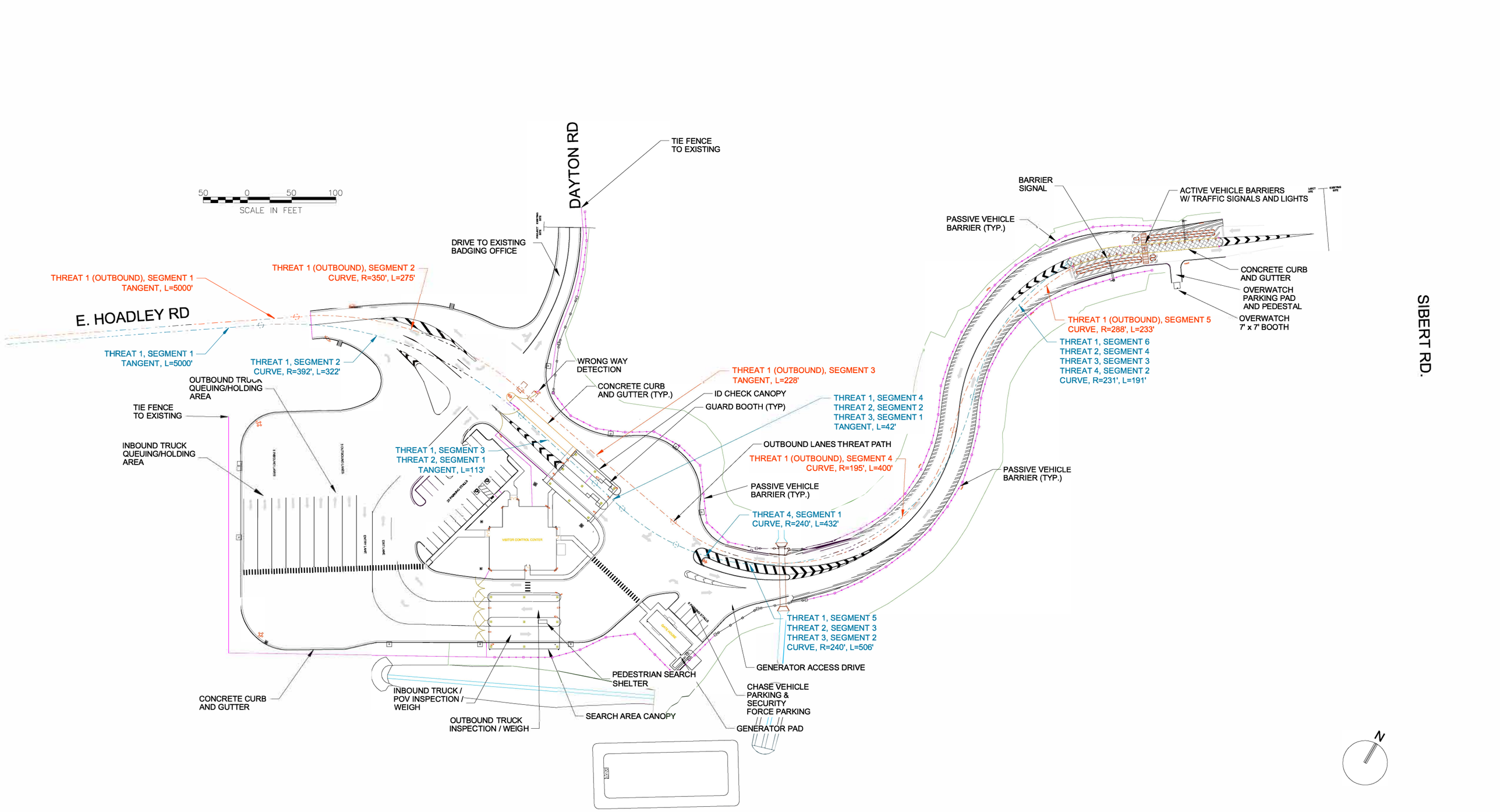
Discipline	Expiration Date
Inspector.....	01/31/2025

Certification Number: 018335

Caleb J. Osborne
Director, Division of Environmental Quality
Chief Administrator of the Environment
Arkansas Department of Energy and Environment

SEEK Watermark

APPENDIX D
THREAT CALCULATIONS


50 0 50 100
SCALE IN FEET
DAYTON RD
SIBERT RD.
E. HOADLEY RD
TIE FENCE TO EXISTING
DRIVE TO EXISTING BADGING OFFICE
THREAT 1 (OUTBOUND), SEGMENT 1 TANGENT, L=5000'
THREAT 1 (OUTBOUND), SEGMENT 2 CURVE, R=350', L=275'
THREAT 1, SEGMENT 1 TANGENT, L=5000'
THREAT 1, SEGMENT 2 CURVE, R=392', L=322'
OUTBOUND TRUCK QUEUING/HOLDING AREA
TIE FENCE TO EXISTING
INBOUND TRUCK QUEUING/HOLDING AREA
THREAT 1, SEGMENT 3 THREAT 2, SEGMENT 1 TANGENT, L=113'
WRONG WAY DETECTION
CONCRETE CURB AND GUTTER (TYP.)
THREAT 1 (OUTBOUND), SEGMENT 3 TANGENT, L=228'
ID CHECK CANOPY
GUARD BOOTH (TYP)
THREAT 1, SEGMENT 4 THREAT 2, SEGMENT 2 THREAT 3, SEGMENT 1 TANGENT, L=42'
OUTBOUND LANES THREAT PATH
THREAT 1 (OUTBOUND), SEGMENT 4 CURVE, R=195', L=400'
PASSIVE VEHICLE BARRIER (TYP.)
THREAT 4, SEGMENT 1 CURVE, R=240', L=432'
THREAT 1, SEGMENT 5 THREAT 2, SEGMENT 3 THREAT 3, SEGMENT 2 CURVE, R=240', L=506'
GENERATOR ACCESS DRIVE
CHASE VEHICLE PARKING & SECURITY FORCE PARKING
GENERATOR PAD
PEDESTRIAN SEARCH SHELTER
SEARCH AREA CANOPY
INBOUND TRUCK / POV INSPECTION / WEIGH
OUTBOUND TRUCK INSPECTION / WEIGH
CONCRETE CURB AND GUTTER
BARRIER SIGNAL
ACTIVE VEHICLE BARRIERS W/ TRAFFIC SIGNALS AND LIGHTS
PASSIVE VEHICLE BARRIER (TYP.)
CONCRETE CURB AND GUTTER
OVERWATCH PARKING PAD AND PEDESTAL
OVERWATCH 7' x 7' BOOTH
THREAT 1 (OUTBOUND), SEGMENT 5 CURVE, R=288', L=233'
THREAT 1, SEGMENT 6 THREAT 2, SEGMENT 4 THREAT 3, SEGMENT 3 THREAT 4, SEGMENT 2 CURVE, R=231', L=191'
PASSIVE VEHICLE BARRIER (TYP.)
N

Project: Pine Bluff Arsenal, AR
Subject: AT/FP
Task: Response Time Calculations - Threat 1 Inbound (Controlling)
Job #: 10400076

Computed by: JCB Date:12/12/2025
Checked by: JDS Date: 12/15/2025

CALCULATIONS

Note: Calculations were performed using Army ACP Standard Design/Criteria (Appendix D) and the US Army Corps of Engineers Protective Design Center Vehicle Threat Delay Calculator developed by the University of Nebraska-Lincoln Nebraska Transportation Center.

Threat Scenario 1

Total Route Travel Time 8.26 seconds (7.0s Required for Hybrid Beacon)

Segment		1	2	3	4	5	6
Type		TANGENT	CURVE	TANGENT	TANGENT	CURVE	CURVE
Length	(ft)	5000	439	59	42	495	193
Radius	(ft)	0	535	0	0	240	226
Superelevation	(%)	0.000	2.000	0.000	0.000	2.000	2.000
Effective Grade	(%)	0.000	0.000	0.000	0.000	0.000	0.000
v_i^{spin}	(ft/s)	190.67	132.56	190.67	190.67	88.78	86.16
v_i^{stable}	(ft/s)	190.67	190.67	190.67	190.67	190.67	190.67
$v_i^{maximum}$	(ft/s)	190.67	132.56	112.92	99.53	88.78	86.16
$v_i^{max\_exit}$	(ft/s)	132.56	112.92	99.53	88.78	86.16	86.16
$v_i^{max\_entry}$	(ft/s)	190.67	132.56	112.92	99.53	88.78	86.16
v_i^{entry}	(ft/s)	190.67	132.56	112.92	99.53	88.78	86.16
v_i^{exit}	(ft/s)	132.56	112.92	99.53	88.78	86.16	86.16
t_i	(s)	26.59	3.37	0.56	0.45	5.58	2.24
Scenario		2	2	2	2	2	1

Detection at Segment 4 at ID Check

SUBSEGMENT CALCULATIONS

v_i^{exit}	(ft/s)	132.56	112.92	99.53	88.78	86.16	86.16
s_i^a	(ft)	0.00	0.00	0.00	0.00	0.00	0.00
s_i^c	(ft)	4610.33	338.98	0.00	0.00	485.46	193.00
s_i^d	(ft)	389.67	100.02	59.00	42.00	9.54	0.00
t_i^a	(s)	0.00	0.00	0.00	0.00	0.00	0.00
t_i^c	(s)	24.18	2.56	0.00	0.00	5.47	2.24
t_i^d	(s)	2.41	0.81	0.56	0.45	0.11	0.00
s_i	(ft)	5000.00	439.00	59.00	42.00	495.00	193.00
t_i	(s)	26.59	3.37	0.56	0.45	5.58	2.24

Project: Pine Bluff Arsenal, AR
Subject: AT/FP
Task: Response Time Calculations - Threat 1 Oubound
Job #: 10400076

Computed by: JCB Date:12/12/2025
Checked by: JDS Date: 12/15/2025

CALCULATIONS

Note: Calculations were performed using Army ACP Standard Design/Criteria (Appendix D) and the US Army Corps of Engineers Protective Design Center Vehicle Threat Delay Calculator developed by the University of Nebraska-Lincoln Nebraska Transportation Center.

Threat Scenario **1** Outbound

Total Route Travel Time **8.94 seconds** **(7.0s Required for Hybrid Beacon)**

Segment		1	2	3	4	5
Type		TANGENT	CURVE	TANGENT	CURVE	CURVE
Length	(ft)	5000	401	139	418	222
Radius	(ft)	0	510	0	209	245
Superelevation	(%)	0.000	2.000	0.000	2.000	2.000
Effective Grade	(%)	0.000	0.000	0.000	0.000	0.000
v_i^{spin}	(ft/s)	190.67	129.42	190.67	82.85	89.70
v_i^{stable}	(ft/s)	190.67	190.67	190.67	190.67	190.67
$v_i^{maximum}$	(ft/s)	190.67	129.42	116.47	82.85	89.70
$v_i^{max\_exit}$	(ft/s)	129.42	116.47	82.85	82.85	89.70
$v_i^{max\_entry}$	(ft/s)	190.67	129.42	116.47	82.85	89.70
v_i^{entry}	(ft/s)	190.67	129.42	116.47	82.85	82.85
v_i^{exit}	(ft/s)	129.42	116.47	82.85	82.85	89.70
t_i	(s)	26.63	3.13	1.39	5.05	2.50
Scenario		2	2	2	1	3

Detection at Segment 3 at Wrong Way Detection

SUBSEGMENT CALCULATIONS

v_i^{exit}	(ft/s)	129.42	116.47	82.85	82.85	89.70
s_i^a	(ft)	0.00	0.00	0.00	0.00	52.32
s_i^c	(ft)	4593.29	334.90	0.00	418.00	169.68
s_i^d	(ft)	406.71	66.10	139.00	0.00	0.00
t_i^a	(s)	0.00	0.00	0.00	0.00	0.61
t_i^c	(s)	24.09	2.59	0.00	5.05	1.89
t_i^d	(s)	2.54	0.54	1.39	0.00	0.00
s_i	(ft)	5000.00	401.00	139.00	418.00	222.00
t_i	(s)	26.63	3.13	1.39	5.05	2.50

Project: Pine Bluff Arsenal, AR
Subject: AT/FP
Task: Response Time Calculations - Threat 2
Job #: 10400076

Computed by: JCB Date:12/12/2025
Checked by: JDS Date: 12/15/2025

CALCULATIONS

Note: Calculations were performed using Army ACP Standard Design/Criteria (Appendix D) and the US Army Corps of Engineers Protective Design Center Vehicle Threat Delay Calculator developed by the University of Nebraska-Lincoln Nebraska Transportation Center.

Threat Scenario 2

Total Route Travel Time 8.97 seconds (7.0s Required for Hybrid Beacon)

Segment		1	2	3	4
Type		TANGENT	TANGENT	CURVE	CURVE
Length	(ft)	59	42	495	193
Radius	(ft)	0	0	240	226
Superelevation	(%)	0.000	0.000	2.000	2.000
Effective Grade	(%)	0.000	0.000	0.000	0.000
v_i^{spin}	(ft/s)	190.67	190.67	88.78	86.16
v_i^{stable}	(ft/s)	190.67	190.67	190.67	190.67
$v_i^{maximum}$	(ft/s)	112.92	99.53	88.78	86.16
$v_i^{max\_exit}$	(ft/s)	99.53	88.78	86.16	86.16
$v_i^{max\_entry}$	(ft/s)	112.92	99.53	88.78	86.16
v_i^{entry}	(ft/s)	36.67	51.75	60.22	86.16
v_i^{exit}	(ft/s)	51.75	60.22	86.16	86.16
t_i	(s)	1.33	0.75	5.98	2.24
Scenario		6	6	5	1

Detection at Segment 2 at ID Check

SUBSEGMENT CALCULATIONS

v_i^{exit}	(ft/s)	51.75	60.22	86.16	86.16
s_i^a	(ft)	59.00	42.00	188.30	0.00
s_i^c	(ft)	0.00	0.00	297.16	193.00
s_i^d	(ft)	0.00	0.00	9.54	0.00
t_i^a	(s)	1.33	0.75	2.53	0.00
t_i^c	(s)	0.00	0.00	3.35	2.24
t_i^d	(s)	0.00	0.00	0.11	0.00
s_i	(ft)	59.00	42.00	495.00	193.00
t_i	(s)	1.33	0.75	5.98	2.24

Project: Pine Bluff Arsenal, AR
Subject: AT/FP
Task: Response Time Calculations - Threat 3
Job #: 10400076

Computed by: JCB Date:12/12/2025
Checked by: JDS Date: 12/15/2025

CALCULATIONS

Note: Calculations were performed using Army ACP Standard Design/Criteria (Appendix D) and the US Army Corps of Engineers Protective Design Center Vehicle Threat Delay Calculator developed by the University of Nebraska-Lincoln Nebraska Transportation Center.

Threat Scenario 3

Total Route Travel Time 12.22 seconds (7.0s Required for Hybrid Beacon)

Segment		1	2	3
Type		TANGENT	CURVE	CURVE
Length	(ft)	42	495	193
Radius	(ft)	0	240	226
Superelevation	(%)	0.000	2.000	2.000
Effective Grade	(%)	0.000	0.000	0.000
v_i^{spin}	(ft/s)	190.67	88.78	86.16
v_i^{stable}	(ft/s)	190.67	190.67	190.67
$v_i^{maximum}$	(ft/s)	99.53	88.78	86.16
$v_i^{max\_exit}$	(ft/s)	88.78	86.16	86.16
$v_i^{max\_entry}$	(ft/s)	99.53	88.78	86.16
v_i^{entry}	(ft/s)	0.00	30.81	86.16
v_i^{exit}	(ft/s)	30.81	86.16	86.16
t_i	(s)	2.73	7.25	2.24
Scenario		6	5	1

Detection at Segment 1 at ID Check

SUBSEGMENT CALCULATIONS

v_i^{exit}	(ft/s)	30.81	86.16	86.16
s_i^a	(ft)	42.00	306.79	0.00
s_i^c	(ft)	0.00	178.67	193.00
s_i^d	(ft)	0.00	9.54	0.00
t_i^a	(s)	2.73	5.13	0.00
t_i^c	(s)	0.00	2.01	2.24
t_i^d	(s)	0.00	0.11	0.00
s_i	(ft)	42.00	495.00	193.00
t_i	(s)	2.73	7.25	2.24

Project: Pine Bluff Arsenal, AR
Subject: AT/FP
Task: Response Time Calculations - Threat 4
Job #: 10400076

Computed by: JCB Date:12/12/2025
Checked by: JDS Date: 12/15/2025

CALCULATIONS

Note: Calculations were performed using Army ACP Standard Design/Criteria (Appendix D) and the US Army Corps of Engineers Protective Design Center Vehicle Threat Delay Calculator developed by the University of Nebraska-Lincoln Nebraska Transportation Center.

Threat Scenario **4**

Total Route Travel Time **7.98 seconds** **(5.0s Required for Hybrid Beacon)**

Segment		1	2
Type		CURVE	CURVE
Length	(ft)	389	193
Radius	(ft)	240	226
Superelevation	(%)	2.000	2.000
Effective Grade	(%)	0.000	0.000
v_i^{spin}	(ft/s)	88.78	86.16
v_i^{stable}	(ft/s)	190.67	190.67
$v_i^{maximum}$	(ft/s)	88.78	86.16
$v_i^{max\_exit}$	(ft/s)	86.16	86.16
$v_i^{max\_entry}$	(ft/s)	88.78	86.16
v_i^{entry}	(ft/s)	36.67	86.16
v_i^{exit}	(ft/s)	86.16	86.16
t_i	(s)	5.74	2.24
Scenario		5	1

Detection at Segment 1

SUBSEGMENT CALCULATIONS

v_i^{exit}	(ft/s)	86.16	86.16
s_i^a	(ft)	289.30	0.00
s_i^c	(ft)	90.16	193.00
s_i^d	(ft)	9.54	0.00
t_i^a	(s)	4.61	0.00
t_i^c	(s)	1.02	2.24
t_i^d	(s)	0.11	0.00
s_i	(ft)	389.00	193.00
t_i	(s)	5.74	2.24

Project: Pine Bluff Arsenal, AR
Subject: AT/FP
Task: Response Time Calculations - General Information
Job #: 10400076

Computed by: JCB Date:12/12/2025
Checked by: JDS Date: 12/15/2025

GENERAL INFORMATION

Units **US STANDARD**

Constants	Symbol	Value	Units
Roadway			
Side Friction	f	1	
Superelevation	e	2	feet/100 feet
Speed	v		ft/s
Distance	s		ft
Time	t		s
Effective grade	G		percent
Maximum speed on segment	v_i^{stable}	130	mi/h
		190.67	ft/s
Covert Entry Speed		60	mi/h
		88	ft/s
Vehicle			
Maximum Deceleration Rate	d	-24.1	ft/s^2
Maximum Acceleration Rate	a	11.3	ft/s^2
General			
Infinity	∞	1E+12	
Acceleration due to gravity	g	32.2	ft/s^2
Threat Scenario 1 Entry Speed		100	mi/h
		146.67	ft/s
Threat Scenario 2 Entry Speed		40	mi/h
		58.67	ft/s
Threat Scenario 3 Entry Speed		0	mi/h
		0	ft/s
Threat Scenario 4 Entry Speed		25	mi/h
		36.67	ft/s

Threat Scenarios

Threat Scenario 1	High Speed - Threat vehicle disregards any overspeed detection system
Threat Scenario 2	High speed - Threat vehicle does not trigger overspeed detection system
Threat Scenario 3	Covert Entry at the ID Check Point
Threat Scenario 4	Covert Entry at the end of the last turnaround

Segment Scenarios

1	Constant Speed (equal to maximum speed allowed on segment)
2	Constant Speed (maximum speed allowed on segment) followed by Deceleration
3	Acceleration to Maximum Speed and then Constant Speed (if applicable)
4	Acceleration Only
5	Acceleration, Constant Speed? and Deceleration
6	Acceleration and Deceleration?

Conversion Rates

mi/h to ft/s	1.466667
km/h to m/s	0.277778
mi/h to km/h	1.60934
km/h to mi/h	0.621373

NOMENCLATURE

Universal Variables

a	Maximum Acceleration Rate	ft/s^2
d	Maximum Deceleration Rate	ft/s^2
g	Acceleration due to gravity	ft/s^2
e	Superelevation	feet/100 feet
f	Side Friction Factor	

Segment Variables

G_i	Effective grade of segment i	percent
L_i	Length	ft
R_i	Radius of segment i	ft
S	Distance	ft
t	Time	s
v_i^{spin}	Spin out speed on segment i	ft/s
v_i^{stable}	Stable, or maximum speed possible not considering constraints, on segment i	ft/s
$v_i^{maximum}$	Maximum speed on segment i (given constraints)	ft/s
$v_i^{max\_exit}$	Maximum exit speed on segment i (given constraints)	ft/s
$v_i^{max\_entry}$	Maximum entry speed on segment i (given constraints)	ft/s

Subsegment Variables

s_i^a	Distance on segment i spent accelerating	ft
s_i^c	Distance on segment i spent at constant speed	ft
s_i^d	Distance on segment I spent decelerating	ft
s_i	Distance on segment I (e.g. length)	ft
t_i^a	Time on segment i spent accelerating	s
t_i^c	Time on segment i spent at constant speed	s
t_i^d	Time on segment I spent decelerating	s
t_i	Time on segment I (e.g. length)	s

50 0 50 100

SCALE IN FEET

DAYTON RD

E. HOADLEY RD

SIBERT RD.

PATH 10
M50/K12 REQUIRED

PATH 4
M50/K12 REQUIRED

PATH 8
M40/K8 REQUIRED

PATH 5
M40/K8 REQUIRED

PATH 1
M30/K4 REQUIRED

PATH 7
M40/K8 REQUIRED

PATH 3
M40/K8 REQUIRED

PATH 14
M40/K4 REQUIRED

PATH 2
M40/K8 REQUIRED

PATH 13
M50/K12 REQUIRED

PATH 11
M30/K4 REQUIRED

PATH 6
M40/K8 REQUIRED

VISITOR CONTROL CENTER

GATE HOUSE

N

Project: Pine Bluff Arsenal, AR
Subject: AT/FP 65%
Task: Passive Barrier Calculations
Job #: 10400076

Computed by: JCB Date:11/11/2025
Checked by: JDS Date: 11/20/2025

CALCULATIONS

Note: Calculations were performed using Army ACP Standard Design/Criteria (Appendix D) and the US Army Corps of Engineers Protective Design Center Vehicle Threat Delay Calculator developed by the University of Nebraska-Lincoln Nebraska Transportation Center along with equations and methodology provided in UFC 4-022-02.

Passive Barrier Rating

θ^{impact}	(deg)	121.2		
$w^{vehicle}$	(lb)	4630		
v_i^{final}	(ft/s)	58.72		
v_i^{final}	(mph)	40.04		
v_p^{final}	(mph)	34.24		
Kinetic Energy	(ft-lb)	181,351	M30/K4 Required	Path 1

Vehicle Speed Calculations

Segment Type		1 TANGENT	2 CURVE	3 CURVE	4 TANGENT	5 CURVE
Length	(ft)	5000	278	97	55	148
Radius	(ft)	0	285	627	0	105
Superelevation	(%)	2.000	-2.000	0.000	-2.000	2.000
Effective Grade	(%)	0.000	0.000	0.000	0.000	0.000
v_i^{spin}	(ft/s)	190.67	94.83	142.09	190.67	58.72
v_i^{stable}	(ft/s)	190.67	190.67	190.67	190.67	190.67
$v_i^{maximum}$	(ft/s)	190.67	94.83	103.80	78.10	58.72
$v_i^{max\_exit}$	(ft/s)	94.83	94.83	78.10	58.72	58.72
$v_i^{max\_entry}$	(ft/s)	190.67	94.83	103.80	78.10	58.72
v_i^{entry}	(ft/s)	190.67	94.83	94.83	78.10	58.72
v_i^{exit}	(ft/s)	94.83	94.83	78.10	58.72	58.72
t_i	(s)	27.22	2.93	1.08	0.80	2.52
Scenario		2	1	6	2	1

SUBSEGMENT CALCULATIONS

v_i^{exit}	(ft/s)	94.83	94.83	78.10	58.72	58.72
s_i^a	(ft)	0.00	0.00	25.16	0.00	0.00
s_i^c	(ft)	4432.36	278.00	0.00	0.00	148.00
s_i^d	(ft)	567.64	0.00	71.84	55.00	0.00
t_i^a	(s)	0.00	0.00	0.26	0.00	0.00
t_i^c	(s)	23.25	2.93	0.00	0.00	2.52
t_i^d	(s)	3.98	0.00	0.82	0.80	0.00
s_i	(ft)	5000.00	278.00	97.00	55.00	148.00
t_i	(s)	27.22	2.93	1.08	0.80	2.52

Project: Pine Bluff Arsenal, AR
Subject: AT/FP 65%
Task: Passive Barrier Calculations
Job #: 10400076

Computed by: JCB Date:11/11/2025
Checked by: JDS Date: 11/20/2025

CALCULATIONS

Note: Calculations were performed using Army ACP Standard Design/Criteria (Appendix D) and the US Army Corps of Engineers Protective Design Center Vehicle Threat Delay Calculator developed by the University of Nebraska-Lincoln Nebraska Transportation Center along with equations and methodology provided in UFC 4-022-02.

Passive Barrier Rating

θ^{impact}	(deg)	136.3		
$w^{vehicle}$	(lb)	4630		
v_i^{final}	(ft/s)	133.46		
v_i^{final}	(mph)	91.00		
v_p^{final}	(mph)	62.89		
Kinetic Energy	(ft-lb)	611,650	M40/K8 Required	Path 2

Vehicle Speed Calculations

Segment		1	2	3	4	5
Type		TANGENT	CURVE	TANGENT	CURVE	CURVE
Length	(ft)	5000	322	158	108	90
Radius	(ft)	0	392	0	500	1665
Superelevation	(%)	2.000	-2.000	0.000	-2.000	2.000
Effective Grade	(%)	0.000	0.000	0.000	0.000	0.000
v_i^{spin}	(ft/s)	190.67	111.22	190.67	125.61	233.85
v_i^{stable}	(ft/s)	190.67	190.67	190.67	190.67	190.67
$v_i^{maximum}$	(ft/s)	190.67	111.22	152.95	125.61	190.67
$v_i^{max\_exit}$	(ft/s)	111.22	111.22	125.61	125.61	190.67
$v_i^{max\_entry}$	(ft/s)	190.67	111.22	152.95	125.61	190.67
v_i^{entry}	(ft/s)	190.67	111.22	111.22	125.61	125.61
v_i^{exit}	(ft/s)	111.22	111.22	125.61	125.61	133.46
t_i	(s)	26.91	2.90	1.33	0.86	0.69
Scenario		2	1	6	1	4

SUBSEGMENT CALCULATIONS

v_i^{exit}	(ft/s)	111.22	111.22	125.61	125.61	133.46
s_i^a	(ft)	0.00	0.00	155.70	0.00	90.00
s_i^c	(ft)	4502.41	322.00	0.00	108.00	0.00
s_i^d	(ft)	497.59	0.00	2.30	0.00	0.00
t_i^a	(s)	0.00	0.00	1.31	0.00	0.69
t_i^c	(s)	23.61	2.90	0.00	0.86	0.00
t_i^d	(s)	3.30	0.00	0.02	0.00	0.00
s_i	(ft)	5000.00	322.00	158.00	108.00	90.00
t_i	(s)	26.91	2.90	1.33	0.86	0.69

Project: Pine Bluff Arsenal, AR
Subject: AT/FP 65%
Task: Passive Barrier Calculations
Job #: 10400076

Computed by: JCB Date:11/11/2025
Checked by: JDS Date: 11/20/2025

CALCULATIONS

Note: Calculations were performed using Army ACP Standard Design/Criteria (Appendix D) and the US Army Corps of Engineers Protective Design Center Vehicle Threat Delay Calculator developed by the University of Nebraska-Lincoln Nebraska Transportation Center along with equations and methodology provided in UFC 4-022-02.

Passive Barrier Rating

θ^{impact}	(deg)	87.9		
$w^{vehicle}$	(lb)	4630		
v_i^{final}	(ft/s)	85.37		
v_i^{final}	(mph)	58.20		
v_p^{final}	(mph)	58.16		
Kinetic Energy	(ft-lb)	523,174	M40/K8 Required	Path 3

Vehicle Speed Calculations

Segment		1	2	3	4	5	6	7
Type		TANGENT	CURVE	TANGENT	CURVE	TANGENT	CURVE	TANGENT
Length	(ft)	5000	188	142	95	115	171	10
Radius	(ft)	0	122	0	65	0	215	0
Superelevation	(%)	2.000	-2.000	0.000	-2.000	2.000	2.000	0.000
Effective Grade	(%)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
v_i^{spin}	(ft/s)	190.67	62.05	190.67	45.29	190.67	84.03	190.67
v_i^{stable}	(ft/s)	190.67	190.67	190.67	190.67	190.67	190.67	190.67
$v_i^{maximum}$	(ft/s)	190.67	62.05	94.32	45.29	112.27	84.03	190.67
$v_i^{max\_exit}$	(ft/s)	62.05	62.05	45.29	45.29	84.03	84.03	190.67
$v_i^{max\_entry}$	(ft/s)	190.67	62.05	94.32	45.29	112.27	84.03	190.67
v_i^{entry}	(ft/s)	190.67	62.05	62.05	45.29	45.29	68.19	84.03
v_i^{exit}	(ft/s)	62.05	62.05	45.29	45.29	68.19	84.03	85.37
t_i	(s)	28.02	3.03	2.24	2.10	2.03	2.17	0.12
Scenario		2	1	6	1	6	3	4

SUBSEGMENT CALCULATIONS

v_i^{exit}	(ft/s)	62.05	62.05	45.29	45.29	68.19	84.03	85.37
s_i^a	(ft)	0.00	0.00	71.27	0.00	115.00	106.70	10.00
s_i^c	(ft)	4325.64	188.00	0.00	95.00	0.00	64.30	0.00
s_i^d	(ft)	674.36	0.00	70.73	0.00	0.00	0.00	0.00
t_i^a	(s)	0.00	0.00	1.05	0.00	2.03	1.40	0.12
t_i^c	(s)	22.69	3.03	0.00	2.10	0.00	0.77	0.00
t_i^d	(s)	5.34	0.00	1.19	0.00	0.00	0.00	0.00
s_i	(ft)	5000.00	188.00	142.00	95.00	115.00	171.00	10.00
t_i	(s)	28.02	3.03	2.24	2.10	2.03	2.17	0.12

Project: Pine Bluff Arsenal, AR
Subject: AT/FP 65%
Task: Passive Barrier Calculations
Job #: 10400076

Computed by: JCB Date:11/11/2025
Checked by: JDS Date: 11/20/2025

CALCULATIONS

Note: Calculations were performed using Army ACP Standard Design/Criteria (Appendix D) and the US Army Corps of Engineers Protective Design Center Vehicle Threat Delay Calculator developed by the University of Nebraska-Lincoln Nebraska Transportation Center along with equations and methodology provided in UFC 4-022-02.

Passive Barrier Rating

θ^{impact}	(deg)	90.0		
$w^{vehicle}$	(lb)	4630		
v_i^{final}	(ft/s)	131.37		
v_i^{final}	(mph)	89.57		
v_p^{final}	(mph)	89.57		
Kinetic Energy	(ft-lb)	1,240,751	exceeds M50/K12 Required	Path 4

Vehicle Speed Calculations

Segment		1	2	3
Type		TANGENT	CURVE	TANGENT
Length	(ft)	5000	69	268
Radius	(ft)	0	355	0
Superelevation	(%)	2.000	-2.000	0.000
Effective Grade	(%)	0.000	0.000	0.000
v_i^{spin}	(ft/s)	190.67	105.84	190.67
v_i^{stable}	(ft/s)	190.67	190.67	190.67
$v_i^{maximum}$	(ft/s)	190.67	105.84	190.67
$v_i^{max\_exit}$	(ft/s)	105.84	105.84	190.67
$v_i^{max\_entry}$	(ft/s)	190.67	105.84	190.67
v_i^{entry}	(ft/s)	190.67	105.84	105.84
v_i^{exit}	(ft/s)	105.84	105.84	131.37
t_i	(s)	27.01	0.65	2.26
Scenario		2	1	4

SUBSEGMENT CALCULATIONS

v_i^{exit}	(ft/s)	105.84	105.84	131.37
s_i^a	(ft)	0.00	0.00	268.00
s_i^c	(ft)	4478.19	69.00	0.00
s_i^d	(ft)	521.81	0.00	0.00
t_i^a	(s)	0.00	0.00	2.26
t_i^c	(s)	23.49	0.65	0.00
t_i^d	(s)	3.52	0.00	0.00
s_i	(ft)	5000.00	69.00	268.00
t_i	(s)	27.01	0.65	2.26

Project: Pine Bluff Arsenal, AR
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CALCULATIONS

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Passive Barrier Rating

θ^{impact}	(deg)	73.5		
$w^{vehicle}$	(lb)	4630		
v_i^{final}	(ft/s)	102.20		
v_i^{final}	(mph)	69.68		
v_p^{final}	(mph)	66.81		
Kinetic Energy	(ft-lb)	690,317	M40/K8 Required	Path 5

Vehicle Speed Calculations

Segment		1	2	3	4
Type		TANGENT	CURVE	TANGENT	CURVE
Length	(ft)	5000	249	80	183
Radius	(ft)	0	311	0	331
Superelevation	(%)	2.000	-2.000	0.000	-2.000
Effective Grade	(%)	0.000	0.000	0.000	0.000
v_i^{spin}	(ft/s)	190.67	99.07	190.67	102.20
v_i^{stable}	(ft/s)	190.67	190.67	190.67	190.67
$v_i^{maximum}$	(ft/s)	190.67	99.07	119.59	102.20
$v_i^{max\_exit}$	(ft/s)	99.07	99.07	102.20	102.20
$v_i^{max\_entry}$	(ft/s)	190.67	99.07	119.59	102.20
v_i^{entry}	(ft/s)	190.67	99.07	99.07	102.20
v_i^{exit}	(ft/s)	99.07	99.07	102.20	102.20
t_i	(s)	27.14	2.51	0.78	1.79
Scenario		2	1	6	1

SUBSEGMENT CALCULATIONS

v_i^{exit}	(ft/s)	99.07	99.07	102.20	102.20
s_i^a	(ft)	0.00	0.00	63.38	0.00
s_i^c	(ft)	4449.38	249.00	0.00	183.00
s_i^d	(ft)	550.62	0.00	16.62	0.00
t_i^a	(s)	0.00	0.00	0.62	0.00
t_i^c	(s)	23.34	2.51	0.00	1.79
t_i^d	(s)	3.80	0.00	0.16	0.00
s_i	(ft)	5000.00	249.00	80.00	183.00
t_i	(s)	27.14	2.51	0.78	1.79

Project: Pine Bluff Arsenal, AR
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CALCULATIONS

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Passive Barrier Rating

θ^{impact}	(deg)	110.9		
$w^{vehicle}$	(lb)	4630		
v_i^{final}	(ft/s)	75.58		
v_i^{final}	(mph)	51.53		
v_p^{final}	(mph)	48.15		
Kinetic Energy	(ft-lb)	358,542	M30/K4 Required	Path 6

Vehicle Speed Calculations

Segment		1	2	3	4
Type		TANGENT	CURVE	TANGENT	CURVE
Length	(ft)	5000	275	102	233
Radius	(ft)	0	350	0	181
Superelevation	(%)	2.000	-2.000	0.000	-2.000
Effective Grade	(%)	0.000	0.000	0.000	0.000
v_i^{spin}	(ft/s)	190.67	105.09	190.67	75.58
v_i^{stable}	(ft/s)	190.67	190.67	190.67	190.67
$v_i^{maximum}$	(ft/s)	190.67	105.09	103.09	75.58
$v_i^{max\_exit}$	(ft/s)	105.09	103.09	75.58	75.58
$v_i^{max\_entry}$	(ft/s)	190.67	105.09	103.09	75.58
v_i^{entry}	(ft/s)	190.67	105.09	103.09	75.58
v_i^{exit}	(ft/s)	105.09	103.09	75.58	75.58
t_i	(s)	27.02	2.62	1.14	3.08
Scenario		2	2	2	1

SUBSEGMENT CALCULATIONS

v_i^{exit}	(ft/s)	105.09	103.09	75.58	75.58
s_i^a	(ft)	0.00	0.00	0.00	0.00
s_i^c	(ft)	4474.91	266.36	0.00	233.00
s_i^d	(ft)	525.09	8.64	102.00	0.00
t_i^a	(s)	0.00	0.00	0.00	0.00
t_i^c	(s)	23.47	2.53	0.00	3.08
t_i^d	(s)	3.55	0.08	1.14	0.00
s_i	(ft)	5000.00	275.00	102.00	233.00
t_i	(s)	27.02	2.62	1.14	3.08

CALCULATIONS

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Passive Barrier Rating

θ^{impact}	(deg)	73.9		
$w^{vehicle}$	(lb)	4630		
v_i^{final}	(ft/s)	87.57		
v_i^{final}	(mph)	59.71		
v_p^{final}	(mph)	57.36		
Kinetic Energy	(ft-lb)	508,862	M40/K8 Required	Path 7

Vehicle Speed Calculations

Segment		1	2	3	4
Type		TANGENT	CURVE	TANGENT	CURVE
Length	(ft)	5000	304	112	135
Radius	(ft)	0	389	0	243
Superelevation	(%)	2.000	-2.000	0.000	-2.000
Effective Grade	(%)	0.000	0.000	0.000	0.000
v_i^{spin}	(ft/s)	190.67	110.79	190.67	87.57
v_i^{stable}	(ft/s)	190.67	190.67	190.67	190.67
$v_i^{maximum}$	(ft/s)	190.67	110.79	114.31	87.57
$v_i^{max\_exit}$	(ft/s)	110.79	110.79	87.57	87.57
$v_i^{max\_entry}$	(ft/s)	190.67	110.79	114.31	87.57
v_i^{entry}	(ft/s)	190.67	110.79	110.79	87.57
v_i^{exit}	(ft/s)	110.79	110.79	87.57	87.57
t_i	(s)	26.92	2.74	1.11	1.54
Scenario		2	1	6	1

SUBSEGMENT CALCULATIONS

v_i^{exit}	(ft/s)	110.79	110.79	87.57	87.57
s_i^a	(ft)	0.00	0.00	11.18	0.00
s_i^c	(ft)	4500.45	304.00	0.00	135.00
s_i^d	(ft)	499.55	0.00	100.82	0.00
t_i^a	(s)	0.00	0.00	0.10	0.00
t_i^c	(s)	23.60	2.74	0.00	1.54
t_i^d	(s)	3.31	0.00	1.01	0.00
s_i	(ft)	5000.00	304.00	112.00	135.00
t_i	(s)	26.92	2.74	1.11	1.54

CALCULATIONS

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Passive Barrier Rating

θ^{impact}	(deg)	36.2		
$w^{vehicle}$	(lb)	4630		
v_i^{final}	(ft/s)	127.00		
v_i^{final}	(mph)	86.59		
v_p^{final}	(mph)	51.10		
Kinetic Energy	(ft-lb)	403,878	M40/K8 Required	Path 8

Vehicle Speed Calculations

Segment		1	2	3
Type		TANGENT	CURVE	TANGENT
Length	(ft)	5000	130	218
Radius	(ft)	0	355	0
Superelevation	(%)	2.000	-2.000	0.000
Effective Grade	(%)	0.000	0.000	0.000
v_i^{spin}	(ft/s)	190.67	105.84	190.67
v_i^{stable}	(ft/s)	190.67	190.67	190.67
$v_i^{maximum}$	(ft/s)	190.67	105.84	190.67
$v_i^{max\_exit}$	(ft/s)	105.84	105.84	190.67
$v_i^{max\_entry}$	(ft/s)	190.67	105.84	190.67
v_i^{entry}	(ft/s)	190.67	105.84	105.84
v_i^{exit}	(ft/s)	105.84	105.84	127.00
t_i	(s)	27.01	1.23	1.87
Scenario		2	1	4

SUBSEGMENT CALCULATIONS

v_i^{exit}	(ft/s)	105.84	105.84	127.00
s_i^a	(ft)	0.00	0.00	218.00
s_i^c	(ft)	4478.19	130.00	0.00
s_i^d	(ft)	521.81	0.00	0.00
t_i^a	(s)	0.00	0.00	1.87
t_i^c	(s)	23.49	1.23	0.00
t_i^d	(s)	3.52	0.00	0.00
s_i	(ft)	5000.00	130.00	218.00
t_i	(s)	27.01	1.23	1.87

CALCULATIONS

Note: Calculations were performed using Army ACP Standard Design/Criteria (Appendix D) and the US Army Corps of Engineers Protective Design Center Vehicle Threat Delay Calculator developed by the University of Nebraska-Lincoln Nebraska Transportation Center along with equations and methodology provided in UFC 4-022-02.

Passive Barrier Rating

θ^{impact}	(deg)	106.5		
$w^{vehicle}$	(lb)	4630		
v_i^{final}	(ft/s)	190.67		
v_i^{final}	(mph)	130.00		
v_p^{final}	(mph)	124.66		
Kinetic Energy	(ft-lb)	2,403,133	exceeds M50/K12 Required	Path 10

Vehicle Speed Calculations

Segment		1	2	3
Type		TANGENT	CURVE	TANGENT
Length	(ft)	5000	163	214
Radius	(ft)	0	1000	0
Superelevation	(%)	2.000	-2.000	0.000
Effective Grade	(%)	0.000	0.000	0.000
v_i^{spin}	(ft/s)	190.67	177.64	190.67
v_i^{stable}	(ft/s)	190.67	190.67	190.67
$v_i^{maximum}$	(ft/s)	190.67	177.64	190.67
$v_i^{max\_exit}$	(ft/s)	177.64	177.64	190.67
$v_i^{max\_entry}$	(ft/s)	190.67	177.64	190.67
v_i^{entry}	(ft/s)	190.67	177.64	177.64
v_i^{exit}	(ft/s)	177.64	177.64	190.67
t_i	(s)	26.24	0.92	1.16
Scenario		2	1	3

SUBSEGMENT CALCULATIONS

v_i^{exit}	(ft/s)	177.64	177.64	190.67
s_i^a	(ft)	0.00	0.00	212.29
s_i^c	(ft)	4900.46	163.00	1.71
s_i^d	(ft)	99.54	0.00	0.00
t_i^a	(s)	0.00	0.00	1.15
t_i^c	(s)	25.70	0.92	0.01
t_i^d	(s)	0.54	0.00	0.00
s_i	(ft)	5000.00	163.00	214.00
t_i	(s)	26.24	0.92	1.16

Project: Pine Bluff Arsenal, AR
Subject: AT/FP 65%
Task: Passive Barrier Calculations
Job #: 10400076

Computed by: JCB Date:11/11/2025
Checked by: JDS Date:11/20/2025

CALCULATIONS

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Passive Barrier Rating

θ^{impact}	(deg)	45.4		
$w^{vehicle}$	(lb)	4630		
v_i^{final}	(ft/s)	71.59		
v_i^{final}	(mph)	48.81		
v_p^{final}	(mph)	34.72		
Kinetic Energy	(ft-lb)	186,458	M30/K4 Required	Path 11

Vehicle Speed Calculations

Segment		1	2	3	4	5
Type		TANGENT	CURVE	TANGENT	CURVE	TANGENT
Length	(ft)	5000	188	142	43	136
Radius	(ft)	0	122	0	65	0
Superelevation	(%)	2.000	-2.000	0.000	-2.000	2.000
Effective Grade	(%)	0.000	0.000	0.000	0.000	0.000
v_i^{spin}	(ft/s)	190.67	62.05	190.67	45.29	190.67
v_i^{stable}	(ft/s)	190.67	190.67	190.67	190.67	190.67
$v_i^{maximum}$	(ft/s)	190.67	62.05	94.32	45.29	190.67
$v_i^{max\_exit}$	(ft/s)	62.05	62.05	45.29	45.29	190.67
$v_i^{max\_entry}$	(ft/s)	190.67	62.05	94.32	45.29	190.67
v_i^{entry}	(ft/s)	190.67	62.05	62.05	45.29	45.29
v_i^{exit}	(ft/s)	62.05	62.05	45.29	45.29	71.59
t_i	(s)	28.02	3.03	2.24	0.95	2.33
Scenario		2	1	6	1	4

SUBSEGMENT CALCULATIONS

v_i^{exit}	(ft/s)	62.05	62.05	45.29	45.29	71.59
s_i^a	(ft)	0.00	0.00	71.27	0.00	136.00
s_i^c	(ft)	4325.64	188.00	0.00	43.00	0.00
s_i^d	(ft)	674.36	0.00	70.73	0.00	0.00
t_i^a	(s)	0.00	0.00	1.05	0.00	2.33
t_i^c	(s)	22.69	3.03	0.00	0.95	0.00
t_i^d	(s)	5.34	0.00	1.19	0.00	0.00
s_i	(ft)	5000.00	188.00	142.00	43.00	136.00
t_i	(s)	28.02	3.03	2.24	0.95	2.33

Project: Pine Bluff Arsenal, AR
Subject: AT/FP 65%
Task: Passive Barrier Calculations
Job #: 10400076

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CALCULATIONS

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Passive Barrier Rating

θ^{impact}	(deg)	106.0		
$w^{vehicle}$	(lb)	4630		
v_i^{final}	(ft/s)	142.72		
v_i^{final}	(mph)	97.31		
v_p^{final}	(mph)	93.54		
Kinetic Energy	(ft-lb)	1,353,151	exceeds M50/K12 Required	Path 12

Vehicle Speed Calculations

Segment		1	2	3
Type		TANGENT	CURVE	TANGENT
Length	(ft)	5000	322	354
Radius	(ft)	0	392	0
Superelevation	(%)	2.000	-2.000	0.000
Effective Grade	(%)	0.000	0.000	0.000
v_i^{spin}	(ft/s)	190.67	111.22	190.67
v_i^{stable}	(ft/s)	190.67	190.67	190.67
$v_i^{maximum}$	(ft/s)	190.67	111.22	190.67
$v_i^{max\_exit}$	(ft/s)	111.22	111.22	190.67
$v_i^{max\_entry}$	(ft/s)	190.67	111.22	190.67
v_i^{entry}	(ft/s)	190.67	111.22	111.22
v_i^{exit}	(ft/s)	111.22	111.22	142.72
t_i	(s)	26.91	2.90	2.79
Scenario		2	1	4

SUBSEGMENT CALCULATIONS

v_i^{exit}	(ft/s)	111.22	111.22	142.72
s_i^a	(ft)	0.00	0.00	354.00
s_i^c	(ft)	4502.41	322.00	0.00
s_i^d	(ft)	497.59	0.00	0.00
t_i^a	(s)	0.00	0.00	2.79
t_i^c	(s)	23.61	2.90	0.00
t_i^d	(s)	3.30	0.00	0.00
s_i	(ft)	5000.00	322.00	354.00
t_i	(s)	26.91	2.90	2.79

Project: Pine Bluff Arsenal, AR
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Passive Barrier Rating

θ^{impact}	(deg)	135.9		
$w^{vehicle}$	(lb)	4630		
v_i^{final}	(ft/s)	126.54		
v_i^{final}	(mph)	86.27		
v_p^{final}	(mph)	60.09		
Kinetic Energy	(ft-lb)	558,442	M40/K8 Required	Path 14

Vehicle Speed Calculations

Segment		1	2	3	4	5
Type		TANGENT	CURVE	TANGENT	CURVE	TANGENT
Length	(ft)	5000	304	144	149	129
Radius	(ft)	0	389	0	415	0
Superelevation	(%)	2.000	-2.000	0.000	-2.000	2.000
Effective Grade	(%)	0.000	0.000	0.000	0.000	0.000
v_i^{spin}	(ft/s)	190.67	110.79	190.67	114.44	190.67
v_i^{stable}	(ft/s)	190.67	190.67	190.67	190.67	190.67
$v_i^{maximum}$	(ft/s)	190.67	110.79	141.55	114.44	190.67
$v_i^{max\_exit}$	(ft/s)	110.79	110.79	114.44	114.44	190.67
$v_i^{max\_entry}$	(ft/s)	190.67	110.79	141.55	114.44	190.67
v_i^{entry}	(ft/s)	190.67	110.79	110.79	114.44	114.44
v_i^{exit}	(ft/s)	110.79	110.79	114.44	114.44	126.54
t_i	(s)	26.92	2.74	1.24	1.30	1.07
Scenario		2	1	6	1	4

SUBSEGMENT CALCULATIONS

v_i^{exit}	(ft/s)	110.79	110.79	114.44	114.44	126.54
s_i^a	(ft)	0.00	0.00	109.62	0.00	129.00
s_i^c	(ft)	4500.45	304.00	0.00	149.00	0.00
s_i^d	(ft)	499.55	0.00	34.38	0.00	0.00
t_i^a	(s)	0.00	0.00	0.94	0.00	1.07
t_i^c	(s)	23.60	2.74	0.00	1.30	0.00
t_i^d	(s)	3.31	0.00	0.29	0.00	0.00
s_i	(ft)	5000.00	304.00	144.00	149.00	129.00
t_i	(s)	26.92	2.74	1.24	1.30	1.07

APPENDIX E
PBA INSTALLATION PLANNING STANDARDS

INSTALLATION PLANNING STANDARDS

PINE BLUFF ARSENAL

FINAL

AUGUST 2019

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INSTALLATION PLANNING STANDARDS

Pine Bluff Arsenal

Project Proponent:

Army Materiel Command

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TABLE OF CONTENTS

1 INTRODUCTION 1
1.1 INSTALLATION PLANNING STANDARDS PURPOSE 1
1.1.1 Building Envelope Standards 1
1.1.2 Street Envelope Standards 1
1.1.3 Landscape Standards 1
1.2 INSTALLATION PROFILE 1
1.2.1 PBA Mission 2
1.3 PLANNING PRINCIPLES 2
1.4 MANAGEMENT OF RESOURCES 3
1.4.1 Healthy Community Planning 4
1.4.2 Defensible Planning 4
1.4.3 Capacity Planning 5
1.5 PLANNING STANDARDS VISUAL ZONES 6
1.5.1 Mission Visual Zone 6
1.5.2 Garrison Visual Zone 7
1.5.3 River Visual Zone 8
2 BUILDING ENVELOPE STANDARDS 11
2.1 BUILDING DESIGN GUIDANCE 11
2.2 BUILDING TYPES 13
2.3 APPLICABILITY OF BUILDING ENVELOPE STANDARDS 17
2.3.1 Building Type 17
2.3.2 Exterior Building Materials 18
2.3.3 Exterior Building Colors 19
3 STREET ENVELOPE STANDARDS 23
3.1 STREET TYPES 23
3.1.1 Primary Streets 23
3.1.2 Secondary Streets 24
3.1.3 Tertiary Streets-Unpaved Roads 24
3.2 PEDESTRIAN STANDARDS 34
3.3 PARKING STANDARDS 35
3.3.1 Parking Lot Location and Design 35
3.3.2 PAVED NON-ORGANIZATIONAL VEHICLE PARKING (ASPHALT) 35
3.3.3 PAVED ORGANIZATIONAL VEHICLE PARKING (CONCRETE) 36
3.3.4 Unpaved Organizational Vehicle Parking Requirements (Gravel / Hardstand) 37
3.3.5 Transporation Standards 42
4 LANDSCAPE STANDARDS 43
4.1 LANDSCAPE INTENT 43

- FOR OFFICIAL USE ONLY -

4.2 SUSTAINABLE LANDSCAPE DEVELOPMENT GUIDELINES 43
4.3 LANDSCAPE DESIGN GUIDELINES 44
4.3.1 Landscape and Streetscape Standards 48
4.4 PLANT PALLETTE AND CATEGORIES 49
5 APPENDICES 57
5.1 APPENDIX A – GLOSSARY OF ACRONYMS 57

LIST OF FIGURES

FIGURE 1-1: PBA PLANNING STANDARDS VISUAL ZONES 9
FIGURE 2-1: BUILDING TYPOLOGIES AND NOTES 15
FIGURE 3-1: PBA STREET CLASSIFICATIONS 25
FIGURE 3-2: PRIMARY STREET STANDARD 27
FIGURE 3-3: PRIMARY INTERSECTION STANDARD, TRADITIONAL 28
FIGURE 3-4: PRIMARY INTERSECTION STANDARD, TRAFFIC CIRCLE 29
FIGURE 3-5: SECONDARY STREET STANDARD, TWO-WAY, paved 30
FIGURE 3-6: SECONDARY INTERSECTION STANDARD, TRADITIONAL 31
FIGURE 3-7: SECONDARY INTERSECTION STANDARD, TRAFFIC CIRCLE 32
FIGURE 3-8: TERTIARY STREET STANDARD, TWO-WAY, UNPAVED 33
FIGURE 3-9: ASPHALT PAVEMENT 36
FIGURE 3-10: PORTLAND CEMENT CONCRETE PAVEMENT (PCCP) 36
FIGURE 3-11: AGGREGATE SURFACING 37
FIGURE 3-12: PARKING STANDARD, MULTI-BAY, PAVED 38
FIGURE 3-13: PARKING STANDARD, SINGLE-BAY, PAVED 39
FIGURE 3-14: PARKING STANDARD, ON-STREET, PARALLEL 39
FIGURE 3-15: PARKING STANDARD, ORGANIZATIONAL, PAVED/UNPAVED 41

LIST OF TABLES

TABLE 2-1: PERMITTED BUILDING TYPES BY VISUAL ZONE 17
TABLE 2-2: PERMITTED BUILDING MATERIALS BY VISUAL ZONE 18
TABLE 2-3: EXTERIOR BUILDING COLORS 19
TABLE 3-1: TRANSPORTATION DESIGN ELEMENTS BY VISUAL ZONE 42
TABLE 4-1: LANDSCAPE DESIGN ELEMENTS BY VISUAL ZONE 48
TABLE 4-2: PLANT PALETTE 51

1 INTRODUCTION

1.1 INSTALLATION PLANNING STANDARDS PURPOSE

The purpose of Installation Planning Standards (IPS) is to provide a clear set of guidelines to ensure that the installation's vision and planning objectives for development are achieved, even if drastic changes to mission or programs occur. These standards are developed to meet sustainability and energy efficiency requirements, promote visual order and architectural consistency, enhance the natural and man-made environments through consistent architectural themes and standards, and improve functional aspects of Pine Bluff Arsenal (PBA).

Form-Based Planning at PBA relates to using a unified development method to address the relationship between building facades and the surrounding elements, as well as the scale and mass of each building in relation to one another. The result of complying with the form-based plan is a high-quality development that uses the physical environment to create separate uses. This IPS includes the following standards:

- Building Envelope Standards
- Street Envelope Standards
- Landscape Standards

1.1.1 BUILDING ENVELOPE STANDARDS

Building Envelope Standards (BES) shape and detail public spaces with the purpose of being safe, comfortable, and functional through placement and envelope controls. The standards aim for the minimum level of control necessary to meet the planning goals, and include building, site planning, and building-related force protection standards. Typical elements defined in each BES are massing, height, placement (e.g., required build-to lines [RBLs] and percentage of building that must be built to the RBLs), allowed parking locations, materials, and function. Each BES is coded to a Regulating Plan, which provides specific guidance that shapes development to conform to the installation's planning vision.

1.1.2 STREET ENVELOPE STANDARDS

Street Envelope Standards (SES) illustrate typical configurations of street types and are required for every type of street specified on the installation. When considering an individual street, the characteristics desired for that street section are documented in plan and section. Each SES includes vehicular traffic-lane widths, curb radii, sidewalks, and tree planting area dimensions. The street types are coded to the Transportation Network Plan developed for each Area Development Plan (ADP) and for the installation.

1.1.3 LANDSCAPE STANDARDS

Landscape standards show the appropriate type and placement of landscape elements, which may include natural landscape features (trees, groundcover, etc.), man-made landscape features (site furnishing, signage, lighting, etc.), and landscape related force protection standards. Landscape standards identify the installation's design intent and allowable plant material.

1.2 INSTALLATION PROFILE

PBA is located in central Arkansas, ten miles northwest of the City of Pine Bluff and 35 miles southeast of Little Rock. The installation is east of Highway 530 and bordered by the Arkansas River to the east. PBA is located in Jefferson County and consists of approximately 13,500 acres with over 600 buildings, and 270 igloos with a storage capacity of two-million square feet.

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1.2.1 PBA MISSION

Providing America's Joint Warfighter with specialized Ammunitions, Smoke, and Chemical, Biological, Radiological and Nuclear (CBRN) Defense capabilities through expert manufacturing, storage and logistics.

1.3 PLANNING PRINCIPLES

Unified Facilities Criteria (UFC) 2-100-01 establishes ten strategies that support the overarching installation planning philosophy for the Department of Defense (DoD), which is to develop a sustainable platform to support the effective execution of assigned military missions as efficiently as possible. Through past planning guides, data gathering, group planning efforts, and interviews with stakeholders and employees, these strategies have been evaluated to determine the six most critical and applicable tactics for the development of PBA, described below:

- Sustainable Planning
- Management of Resources
- Healthy Community Planning
- Defensible Planning
- Capacity Planning
- Facility Standardization

Sustainable Planning

Sustainability requires the built environment to be designed and constructed to preserve and enhance the natural environment. Man-made facilities are designed as a part of the environment to minimize negative environmental impacts. General site planning techniques resulting in sustainable development may be cost-efficient because they conserve energy and reduce construction, maintenance, and operation cost. Practicing the principles of sustainable design in the planning, design, construction, and operation of infrastructure and facilities is a smart business practice. Protecting natural resources and reducing impact on the natural environment is achievable with high-performance, healthy, energy efficient, and safe environments and buildings.

Building Orientation and Configuration

- Arrange buildings to optimize building and mission support performance, conserve energy, and enhance the indoor environment (air quality, thermal comfort, and daylighting).
- Promote natural light and ventilation into building core spaces.
- Design narrow buildings, where appropriate, to define outdoor spaces or utilize gaps between existing developed areas.

Campus like setting near Headquarters Building.

Life Cycle Planning

- Consider the full life cycle cost of planning and decisions with a focus on return on investment.
- Remove existing assets which can no longer be reused or repurposed.

Transportation Networks

- Link the installation to surrounding transportation access and connect to outside transit systems.
- Visual Zones and uses within them, are thoroughly connected by roads, sidewalks, and bikeways.
- Use a modified grid pattern. A connected network of streets provides multiple route options for vehicular and pedestrian traffic. The modified grid pattern is designed to maximize safety for all users.

Existing sidewalk on Sibert Road.

Horizontal and Vertical Mixed-Uses

- Allow people to walk or bike from one use to another with horizontal mixed-use zones
- Collocate compatible uses within the same building. Examples of compatible uses include community support, medical, administrative, and classroom.
- Combine multiple uses into multi-story buildings, where appropriate and possible, to improve land-use efficiency.
- Create a campus or town-like atmosphere.
- Increase efficiency since energy-use peaks are offset.

1.4 MANAGEMENT OF RESOURCES

Within the DoD, land is a valuable resource for installation sustainability and future viability. Natural, historic, and cultural resources must be considered early in the planning process to avoid project delays and costs associated with developing in or near these areas. Natural resources include threatened or endangered species, wetlands, habitats, forests, undisturbed land, and viewsheds. Historical and cultural resources include cemeteries, historic properties, sacred lands, and archaeological sites.

Adaptability

- Maintain ability to adjust to changing mission requirements.
- Provide military value as an enduring installation.
- Provide and maintain a buffer between the civilian community and key functions of the installation.

Land Preservation

- Preserve land to the maximum extent possible.
- Preserve and maintain natural drainage areas and floodplains. Limit development in floodplains to open spaces and recreational uses.

Yellow Lake at PBA.

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- Preserve rivers, lakes, streams, or other waterways.
- Preserve the natural site by molding development to fill around existing landforms and features.
- Minimize extensive earthwork, preserve existing drainage patterns, and preserve existing vegetation to reduce maintenance and enhance sustainability.
- Select plantings and plan maintenance to reduce the harborage of rodents.

1.4.1 HEALTHY COMMUNITY PLANNING

Facilities should be planned and designed to promote physical activity and enhance quality of life and work environment for employees.

Planning for Walking, Running, and Biking

- Connect land uses and facilities with continuous and safe pathways. Key destinations include the employment centers, fitness center, and food locations.
- Design and locate pedestrian walkways and bicycle paths to fit the physical environment, and provide a comfortable pedestrian experience, limiting conflicts with vehicular traffic.

Quality of Life and Work Environment

- Provide access to dining facilities with healthy food choices within proximity to workplaces.
- Comply with Occupational Safety and Health Administration (OSHA) standards.
- Provide adequate break facilities.
- Orient outdoor pedestrian areas for the most comfortable seasonal exposure.

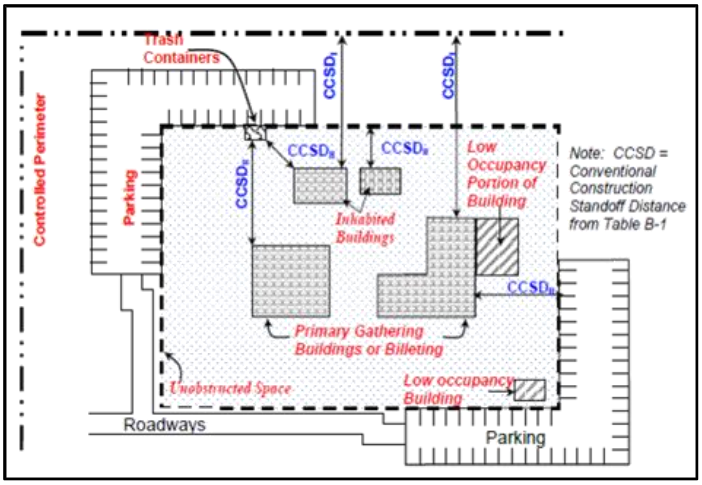
Existing ball field in Garrison Visual Zone.

Provide Recreation Opportunities

- Encourage physical activity.
- Provide open space for active and passive recreation. Protect pathways used for physical fitness training.

1.4.2 DEFENSIBLE PLANNING

Defensible Planning is recognized as a critical planning category for PBA, with Anti-Terrorism/Force Protection (AT/FP) and protection of critical infrastructure as top priorities. Critical infrastructure may include both on-post and off-post assets such as buildings, bridges, dams, facilities, and utility and transportation systems.



Conventional construction standoff distances within a controlled perimeter. Source: UFC 4-010-01, DoD Minimum Antiterrorism Standards for Buildings.

AT/FP and Standoff Distances

- Comply with standards for building siting and construction for inhabited buildings.
- Comply with specific requirements related to the installation perimeter, installation access

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control points, and the location of high value assets.

- Cluster facilities in a high-density core with parking and vehicular circulation on the perimeter to reduce the required protection area.

Critical Infrastructure

- Incorporate Defense Critical Infrastructure Program (DCIP) analysis to minimize risk to strategic infrastructure.

Surveillance and Access Control

- Site and orient facilities to allow for natural surveillance of the built environment.
- Shape defensible areas with clear property lines, landscape elements that define public and private spaces, and buildings arranged in close proximity.
- Design streets, sidewalks, and building entries to clearly mark public and private routes.
- Utilize landscaping, fencing, and building orientation to control access.

Protective bollards currently in Mission Visual Zone.

1.4.3 CAPACITY PLANNING

Capacity Planning considers maximum development potential of the installation beyond known requirements. Planning for future growth includes identifying potential future workload along with the associated development of buildings, transportation networks, and utilities infrastructure.

Infrastructure Consideration

- Install utilities to meet maximum development capacity.
- Focus development towards the core of the installation.
- Design and locate roads to provide a hierarchy of traffic carrying capacities.

Capacity Planning and Parking

- Maximize development capacity based on conformance to the installation's planning vision, goals, and objectives.
- Proactively plan for future growth.
- Minimize parking to the maximum extent possible through land use practices that support shared-use parking, transit, and alternative modes of transportation.
- Design and locate parking lots to minimize visual impact of broad expanses of pavement and vehicles.

Temporary boiler plant in Mission Visual Zone.

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1.5 PLANNING STANDARDS VISUAL ZONES

The establishment of Planning Standards Visual Zones allows stakeholders to cater IPS recommendations and requirements to specific geographic sub-areas within an installation. PBA stakeholders defined three Visual Zones outlined below and represented in Figure 1-1 based on common characteristics of buildings, vehicular and pedestrian corridors, functional use, natural features, and spatial relationships.

- Mission Visual Zone
- Garrison Visual Zone
- River Visual Zone

Preferred building type for motor pool in Mission Visual Zone.

1.5.1 MISSION VISUAL ZONE

The Mission Visual Zone is divided into north and south areas where all the production and storage facilities are located. The largest facilities in the northern portion of the Mission Visual Zone include the main shipping and receiving warehouse and Materiel Management (MM) Operations. Much of the western and northwest corner of the installation is comprised of earth covered storage facilities, or igloos, that house both explosive and non-explosive materiel. Most of the production facilities are located in the southern portion of the visual zone. There are four production complexes: 31, 32, 33, and 34 Areas. Non-production functions include the Directorate of Public Works (DPW) facilities, water treatment facilities, and the motor pool and logistics areas.

Igloo in Mission Visual Zone.

Both sections have rail access and roadways that are considered to be in good condition. The terrain within the whole installation is relatively flat which allows for the siting of large industrial buildings. The existing industrial buildings vary in construction materials from Concrete Masonry Unit (CMU) walls with asphalt shingles, masonry block walls with metal roofs, standing seam metal sides and roof, and concrete walls with metal roofs. The various structures depict the time period in which they were built and the functionality behind them. There is no consistent architectural theme throughout the Mission

Preferred building type for administration buildings in Mission Visual Zone.

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Visual Zone. New facilities should be consistent with Area 57 buildings for mission related production. The locations of proposed facilities will have to be coordinated with Explosive Safety Quantity-Distance (ESQD) arcs that are present in most of the visual zone and restrict inhabited development to areas that are compatible with explosives operation.

Landscaping in the Mission Visual Zone is very minimal. There is forested area on the periphery of the production areas, but overall the visual zone lacks landscaping associated with buildings, entrances, intersections, and parking lots. Street trees and foundation plantings are restricted within the visual zone. However, bioswales and other green infrastructure may be implemented to assist in stormwater infiltration and counteract the heat island effect.

Preferred building type for production facilities in Area 57 in Mission Visual Zone.

1.5.2 GARRISON VISUAL ZONE

The Garrison Visual Zone is located at the center of the installation. Some of the facilities identified in this visual zone are the Headquarters, Fire Headquarters, Fitness Center, Staff Row Residential Area, the Child Development Center (CDC), and the Health Clinic. The visual zone is bisected by Sibert Road, the installation's main thoroughfare, and primary route between production areas. According to guidance provided during the IPS workshop, PBA would like to propose a potential haul road farther north from the visual zone which would improve efficiency and safety.

Headquarters building in Garrison Visual Zone.

CDC in Garrison Visual Zone.

In general, the Garrison Visual Zone lacks a common theme, as the zone has various building typologies which do not constitute a coherent appearance. This variation is due to the different eras in which the buildings were constructed. The Headquarters is a white clapboard-sided building with black metal roof while the surrounding buildings have more of a modern appearance. Brick, clapboard, and concrete siding is more prevalent in this area. Future development in the Garrison Visual Zone should remain in the Sibert Road corridor and adopt the proposed architectural theme including architectural style, color, and materials noted in Table 2-2 to

transition to a more cohesive architectural theme.

The forested areas to the north and south allow for the visual zone to remain buffered from existing land uses in the production areas while maintaining a distinguishable character from the rest of the installation. Development within the Garrison Visual Zone may require an extension of the street grid with additional streetscape elements and consolidated parking lots. The parking lots will implement Best Management Practices (BMPs) for stormwater runoff and heat island effect reduction. Pedestrian access and circulation are more critical in this visual zone than in any other. New walkways will create a campus-like setting and provide recreational opportunities for employees between buildings. Street trees in appropriate areas will add shade for pedestrians using the walkways while still maintaining an open feel.

Family housing in Garrison Visual Zone.

1.5.3 RIVER VISUAL ZONE

Open areas not within the Mission or Garrison Visual Zones are considered the River Visual Zone. Much of this section includes woodlands and open space west of the Garrison Visual Zone toward the Arkansas River. Yellow Lake is a prominent feature in the area. This lake setting is a valuable asset for outdoor recreation for individuals and groups to fish and picnic.

Dilly Pond at Conference Center.

There are a few buildings in the area most of which are infrequently used. The most frequently occupied building is the Conference Center off Hoadley Road situated next to Dilly Pond. This area includes amenities such as picnic tables and pavilions. The pavilion is situated next to Dilly Pond and provides a very picturesque setting, aesthetically distinct from the rest of the installation. The architectural style of the pavilion is reminiscent of a lodge or cabin. A rifle range station near the river is used during target practice. There is also an accompanying metal shelter with aluminum bleachers. North of the shooting range is another open pavilion within the Morale, Welfare and Recreation (MWR) campsites and boat launch. There are four designated areas with their own picnic table, utility pedestal, and charcoal grills. The River Visual Zone lends itself for new pavilions and site furnishings near the lake or MWR campsite area.

Exterior building material at Shooting Range.

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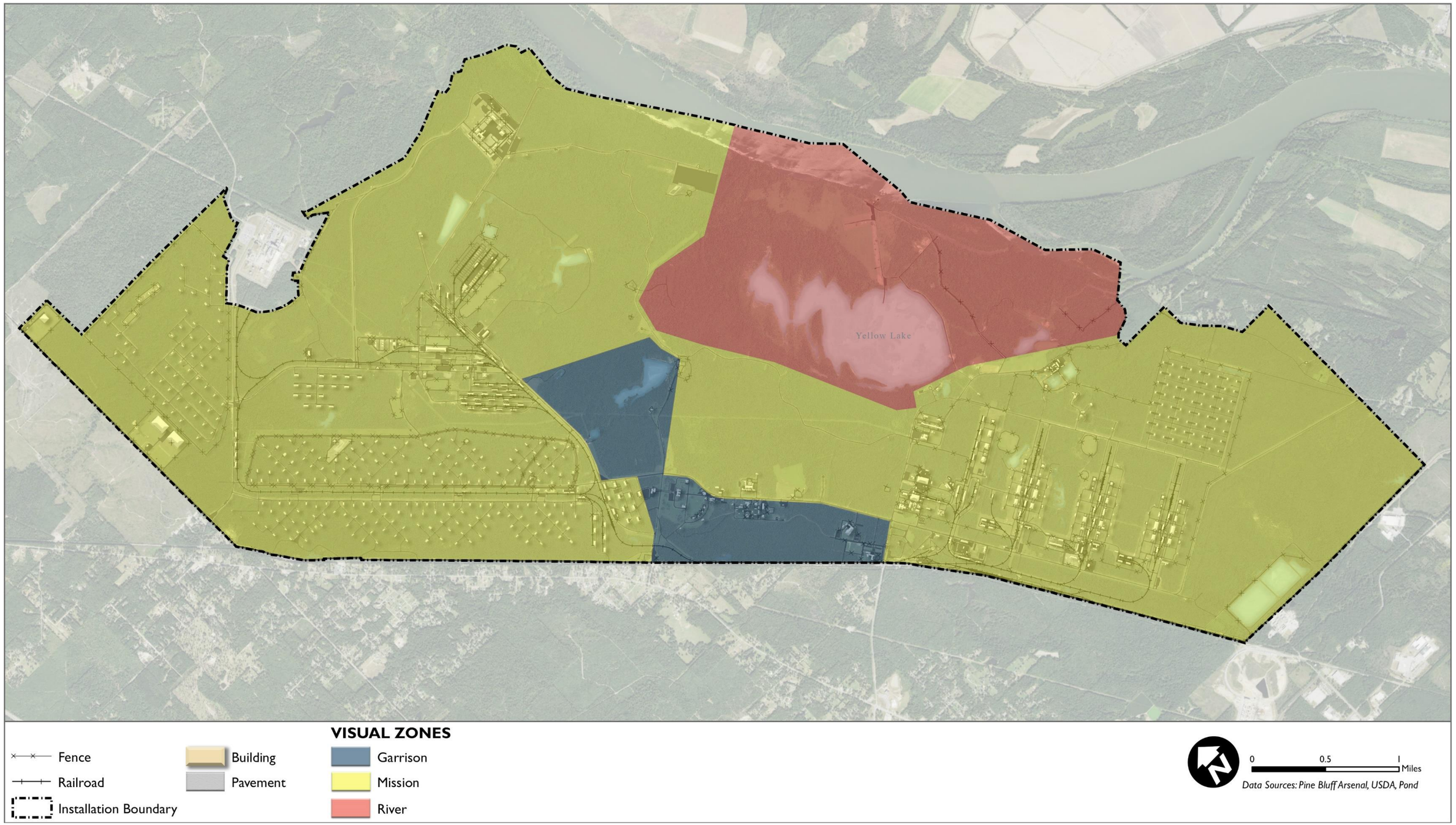
FIGURE 1-1: PBA PLANNING STANDARDS VISUAL ZONES



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2 BUILDING ENVELOPE STANDARDS

Building Envelope Standards shape and detail public spaces with the purpose of being safe, comfortable, and functional through placement and envelope controls. The standards aim for the minimum level of control necessary to meet the planning goals, and include building, site planning, and building-related force protection standards.

Typical elements defined in each BES are massing, height, placement (e.g., required build-to lines and percentage of building that must be built to the required build-to lines), allowed parking locations, materials, and function. Each BES is coded to a Regulating Plan.

The design character of an installation's buildings affects the overall installation image. Building design components encompass the character of the buildings as well as their relationships to one another and the environment. This section includes BES that regulate the form, setbacks, uses, and support requirements of any given construction project at PBA.

2.1 BUILDING DESIGN GUIDANCE

Building Entrances

A building entrance is a primary feature of any building design. The primary entrance should be defined and recognizable as the point of access regardless of the size or the importance of the building. In some instances, there may be two primary entrances, or a secondary entrance that will require special treatment. This could exist where the building is sited on a corner, or where the tenants will use the primary entrance at the rear and the ceremonial entrance faces the primary street. The entry treatment, in terms of level of architectural detail and prominence, must adhere to a logical order of hierarchy and aesthetic design within the context of the building and site. This section provides guidelines for establishing and designing exterior spaces.

- The entrance to a building should be in a prominent location and should be oriented toward the primary adjacent public spaces such as a courtyard, lawn, parking lot, or street.
- Entrance details should be designed to provide continuity with other entrances to the building and the entrances of adjacent buildings.
- A half arc over the primary door or "eyebrow roof line" should be used to emphasize entryways.
- The style, color, texture, and scale of all entrance canopies and porches shall be compatible with the existing building.

Building 17500 entrance at Garrison Visual Zone.

- Vestibules should be provided within the existing building envelope, if possible.
- Replacement, storm, and insulated doors must be architecturally compatible with existing building style.
- Modifications or alterations to entrances, doors, and vestibules of historic buildings are not allowed.
- Accessible ramps, railing, and signage shall be consistent with building character, and they should be placed in areas that do not detract from the building's appearance. Americans with Disabilities Act (ADA) compliance must be considered during design of all buildings.

- The design of the walkway and paved area in front of the entrance doors is directly related to the building function and number of occupants that use the facility.

Courtyards and Plazas

Exterior spaces such as plazas, courtyards, employee break areas, and recreation areas provide desirable places between the outdoors and the indoors where people can enjoy a variety of functions from passive activities such as reading, eating, or sitting, to more active uses such as walking, running, and biking. These spaces can be informal, formal, private, semi-private, or public. They can be designed as transition spaces that take the user from one building to another, spaces for people to sit, or as an entrance space to a building or group of buildings. Design of plazas and courtyards depends heavily on the building's function and number of occupants. This section provides guidelines for establishing and designing exterior spaces.

- Orientation of exterior spaces may have an inward or outward focus. An inward focus refers to spaces that concentrate on an internal focal point such as a fountain or sculpture. Outward focus refers to spaces that take advantage of good views and vistas beyond the space.
- Maintain a 1:1, 2:1, or 3:1 ratio between the horizontal plane and height of vertical elements to insure a user-friendly space.
- Design spaces suitable for pedestrian use that integrate seating, lighting, planting, and paving.
- Standardize site furnishings such as benches and outdoor covered areas to make outdoor break areas welcoming, safe, and easily identifiable.

Outdoor employee break area.

- Provide an east-west orientation, screen for north winds, and shade from the summer sun.
- Relate courtyards and plazas to existing buildings and surroundings. Courtyards are typically small open spaces defined by buildings on three or four sides. Plazas are typically larger open spaces defined by buildings on one or two sides.
- Provide barrier-free pedestrian accessibility into the space.
- Use plants to articulate space by establishing a ground plane (paving, ground cover), middle plane (trees, shrubs), and overhead plane (tree canopy, trellis), to modify the climate and provide scale and aesthetic elements.
- Use paving to provide a sense of direction and scale, indicate level changes, separate pedestrian and vehicular traffic, and for visual accent.
- Plazas and courtyards need to meet AT/FP requirements. Wide, paved entrance plazas need vehicular barriers.

Flooring

A light grey water-borne epoxy formula (for low odor and reduced yellowing) that meets all national volatile organic compound (VOC) regulations shall be used as a floor coating within warehouse and production areas. This floor finish is considered a BMP and is used in commercial, institutional or industrial environments or where a tough impact, abrasion, mar and stain resistant coating is required.

2.2 BUILDING TYPES

The following building types are either currently found at PBA or have been identified as appropriate for potential future development:

- **Administrative Building Types:** headquarters facilities, general offices, training, laboratories, educational, community support, family housing,
- **Flex-use:** administrative, laboratory, commercial, health clinic, fire station, police station, recreational billets, other
- **Industrial Building Types:** production and maintenance facilities, warehouses, waste treatment facilities
- **Munitions Storage Building Types:** magazine area
- **Open Space Types:** undeveloped space, park and recreation space, and land management

For each of these building types, massing, height, placement (e.g., RBLs and percentage of building that must be built to the RBLs), allowed parking locations, materials, and functions have been defined in Figure 2-1.

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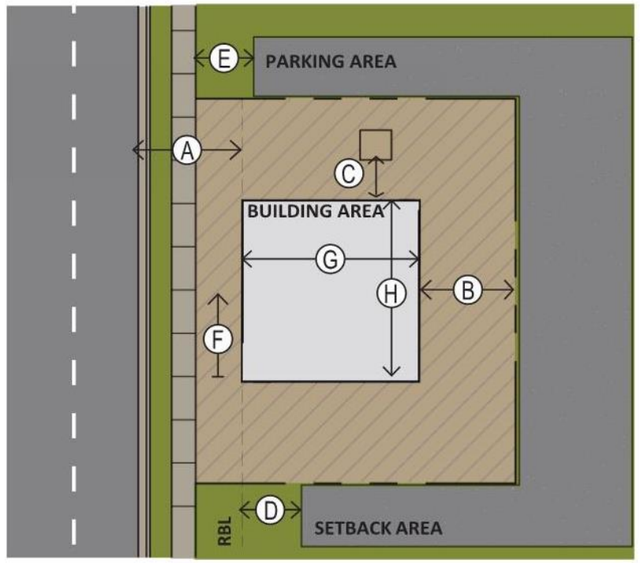
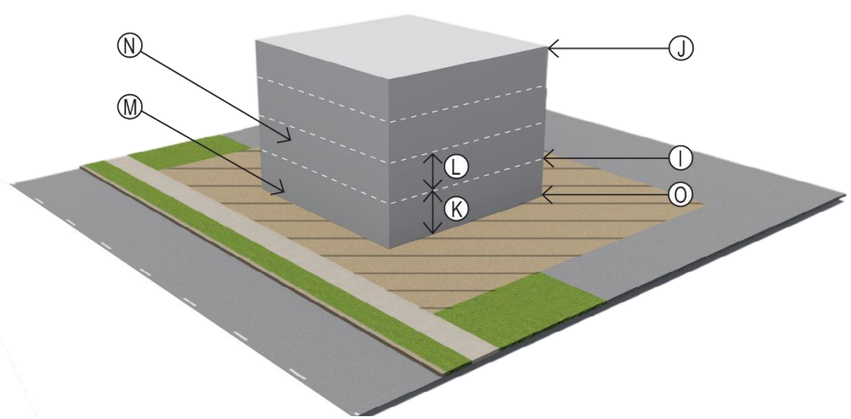
FIGURE 2-1: BUILDING TYPOLOGIES AND NOTES





Note: Drawings in this document are presented only for planning purposes to provide recommended dimensions.

TYPE		ADMINISTRATIVE	FLEX-USE	INDUSTRIAL	MUNITION STORAGE	OPEN SPACE
Use						
Ground Floor		Administrative, Laboratory	Administrative, Laboratory, Commercial, Medical, Other	Industrial, Administrative	Magazine, Storage	Open Space, Recreation
Upper Floor(s)						
Placement						
All Setbacks	Ⓐ-Ⓔ	Based on AT/FP Standoff Requirements				
Shape						
Primary Street Building to RBL	Ⓕ	70% Minimum			N/A	N/A
Building Width	Ⓖ	No Maximum	50’ Maximum	No Maximum	Standard Design	No Maximum
Building Length	Ⓗ	No Maximum	N/A	No Maximum	Standard Design	No Maximum
Height						
Minimum Number of Floors	Ⓘ	Refer to Regulating Plan				
Maximum Number of Floors	Ⓙ	Refer to Regulating Plan				
First Ground Floor Level	Ⓞ	No Maximum	12” Minimum Above Finished Grade	No Maximum		12” Minimum Above Finished Grade
First-to-Floor Ceiling Height	Ⓚ	No Maximum	12’ Minimum Clear, 20’ Maximum	No Maximum		12’ Minimum Clear, 20’ Maximum
Floor-to-Floor Height	Ⓛ	14’ Maximum	14’ Maximum	N/A		14’ Maximum
Fenestration						
Percent of Façade Area (Ground Floor)	Ⓜ	60%-90%	40%-90%	N/A	N/A	60%-90%
Percent of Façade Area (Upper Floors)	Ⓝ	40-70%	40-90%	N/A	N/A	N/A

GENERAL NOTES
All Building Typologies
Setback from roadways and other buildings must conform to minimum current AT/FP guidance.
Primary entries should align to where designated on the regulating plan.
Blank lengths of wall exceeding 15’ are prohibited on RBLs.
Windows should be oriented according to impact of climate conditions and operable to allow air flow and circulation. Inoperable windows should be used for store frontage, and hermetically sealed windows should be used as required.
Balconies, bay windows, arcades, etc. can encroach up to 2’ beyond RBL.
Roof pitches of 2:12 to 8:12 are allowable for primary occupied buildings.
South-facing windows shall be shaded from summer suns (overhangs, recesses, etc.).
Designer shall incorporate sustainability strategies (i.e., light shelves, clearstory windows, and maximum glazing areas).
If access is controlled, government vehicle is not subject to setbacks.
Industrial/Administrative
Administrative type facilities should incorporate human scale, horizontally designed façades.
70% of each building must be built within the buildable area boundary.
Where no RBL is designated, a building may occupy any portion of the site within the buildable boundary.
Parking shall be based on program occupant load.
Flex-Use
Corner lot street facades must be built to RBL within 30’ of street corner.
Maximum 3 parking spaces per 1,000 SF of floor space.
Trees shall be planted such that 70% of parking area will be shaded within 15 years.

Note: Drawings in this document are presented only for planning purposes to provide recommended dimensions.

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2.3 APPLICABILITY OF BUILDING ENVELOPE STANDARDS

2.3.1 BUILDING TYPE

As indicated in Table 2-1, within each Planning Standards Visual Zone, building types are *Permitted, Permitted with Restrictions*, or *Restricted.*

TABLE 2-1: PERMITTED BUILDING TYPES BY VISUAL ZONE

BUILDING TYPE	PLANNING STANDARDS VISUAL ZONES		
	MISSION	GARRISON	RIVER
ADMINISTRATIVE: HQ facilities, general offices, training, educational, processing center, medical clinic, and community support	🟡	🟢	🟢
FLEX-USE: Any approved use	🟢	🟢	🟢
INDUSTRIAL: Production and maintenance facilities, warehouse, logistics, vehicle maintenance, storage	🟢	🔴	🔴
MUNTIONS STORAGE: Magazine area, open space	🔴	🔴	🔴
OPEN SPACE: Undeveloped space, park and recreation space, and land management	🔴	🟢	🟢

🟢 *Permitted* 🟡 *Permitted with Restrictions* 🔴 *Restricted*

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2.3.2 EXTERIOR BUILDING MATERIALS

At PBA, approved materials for the exterior cladding of a building are determined by Visual Zone location. These standards are only necessary for the Mission, Garrison, and River Visual Zones. Table 2-2 provides these designations.

TABLE 2-2: PERMITTED BUILDING MATERIALS BY VISUAL ZONE

BUILDING DESIGN ELEMENT	PLANNING STANDARDS VISUAL ZONES		
	MISSION	GARRISON	RIVER
Brick	🔴	🟢	🔴
Metal	🟢	🟡	🟢
Wood	🔴	🔴	🔴
CMU	🟡	🟡	🟢
Concrete	🟢	🟡	🟢
Natural Stone	🟢	🟡	🟢

🟢 *Permitted* 🟡 *Permitted with Restrictions* 🔴 *Restricted*

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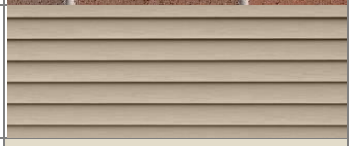
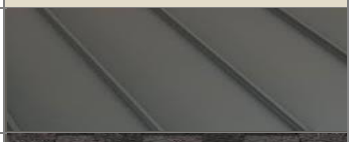
2.3.3 EXTERIOR BUILDING COLORS

At PBA, approved colors for the exterior of a building are determined by building material. Table 2-3 provides these designations.

TABLE 2-3: EXTERIOR BUILDING COLORS

BUILDING DESIGN ELEMENT			COLOR STANDARD	COLOR EXAMPLES
BRICK BUILDING	WALLS	Primary materials	Meridian Brick- Flat Set Red Brown, smooth, running course	
		Secondary Material	Vinyl Siding, neutral beige tones	
		Concrete panels or Wainscoting	Neutral beige tones Pantone Warm Gray 1C	
	ROOF	Sloped roof areas	Standing Seam Metal, Pantone 425 C or similar manufacturer color	
		Sloped Roof: Secondary	Asphalt Shingle	
		"Flat" roof areas	Material White in Color	
	FENESTRATION	Door and window frames	Pantone 7497 C	
		Window sash	Pantone 7497 C	
	TRIM	Fascia and soffit	Pantone 7528 CP	
		Gutters and downspouts	Pantone 7497 C	
		Awnings and canopies	Pantone 7497 C	
		Handrailing and other trim	Primary Accent Color: Pantone 11-0601 TCX Bright White	
			Secondary Accent Color: Pantone 102 PC	
METAL BUILDING	WALL	Primary materials	Metal Panels: Pantone Warm Gray 1 C	
	ROOF	Sloped roof areas	Metal White (Preferred)	
		"Flat" roof areas	Metal White or Pantone 11-0601 TCX Bright White	

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BUILDING DESIGN ELEMENT			COLOR STANDARD	COLOR EXAMPLES
	FENESTRATION	Door and window frames	Metal White or Pantone 11-0601 TCX Bright White	
		Window sash	Metal White or Pantone 11-0601 TCX Bright White	
	TRIM	Fascia and soffit	Metal White or Pantone 11-0601 TCX Bright White	
		Gutters and downspouts	Metal White or Pantone 11-0601 TCX Bright White	
		Awnings and canopies	Pantone 7528 CP	
		Handrailing and other trim	Metal White or Pantone 11-0601 TCX Bright White	
		Fire Escapes	Pantone 102 PC	
		Guard Pipes/Rails/Bollards	Pantone 102 PC	
		Lower 3’ Portion of Overhead Doors	Pantone 102 PC	
CONCRETE BUILDING	WALLS	Primary materials	Concrete Wall Panels or Limestone neutral gray tones (Pantone Warm Gray 1 C)	
		Secondary materials	Metal White or Pantone 11-0601 TCX Bright White	
	ROOF	Sloped roof areas	Metal White	
		“Flat” roof areas	Metal White or Pantone 11-0601 TCX Bright White	
	FENESTRATION	Door and window frames	Pantone 7528 CP	
		Window sash	Pantone 7528 CP	
	TRIM	Fascia and soffit	Pantone 11-0601 TCX Bright White	
		Gutters and downspouts	Pantone 11-0601 TCX Bright White	
		Awnings and canopies	Pantone 11-0601 TCX Bright White	
		Handrailing and other trim	Pantone 11-0601 TCX Bright White	
		Fire Escapes	Pantone 102 PC	
		Guard Pipes/Rails/Bollards	Pantone 102 PC	

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BUILDING DESIGN ELEMENT			COLOR STANDARD	COLOR EXAMPLES
		Lower 3’ Portion of Overhead Doors	Pantone 102 PC	
CMU BUILDING	WALLS	Primary materials	Split-face CMU with integral color, earth tone or similar manufacturer color	
	ROOF	Sloped roof areas	Metal White (Preferred)	
	FENESTRATION	Doors / Windows/ Sash	Primary Accent Color: Pantone 7528 CP	
			Secondary Accent Color: Pantone 7497 C	
		Window sash	Tertiary Accent Color: Pantone 425 C	
	TRIM	Fascia and soffit	Pantone 7497 C	
		Gutters and downspouts	Pantone 7497 C	
		Awnings and canopies	Pantone 7497 C	

Source: 2015 Pine Bluff Arsenal IPS, 2019 ADEP/IPS Workshop.

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3 STREET ENVELOPE STANDARDS

The image and functionality of the installation is greatly determined by the design and location of roadways, walkways, entrances, and parking lots. The primary roadway system and parking lots utilize considerable amounts of land and are a visually dominant element of any installation. These standards illustrate typical configurations for all street types on an installation through SES. Each SES will address vehicular traffic-lane widths, curb radii, sidewalk and tree planting area dimensions, and parking configurations. Every type of street specified on the installation requires an SES. Existing street classifications at PBA are illustrated in Figure 3-1.

3.1 STREET TYPES

3.1.1 PRIMARY STREETS

Primary streets are arterial routes that connect major activity centers, provide primary access through the installation, and provide the means by which most people view the installation. Typically paved, these roadways often traverse the entire installation and carry the heaviest volume of traffic that results in high speed and high visibility corridors.

Primary streets should have continuous through-traffic alignments that are relatively straight or large-radii curvilinear to handle moderate to heavy traffic. Direct access to this type of road should be restricted to crossings at major intersections. Primary roadways are designated as boulevards in urban areas and avenues in suburban areas but may vary due to local usage. Additional design characteristics include the following:

- Two or more moving lanes in each direction divided by a median is ideal, though the scale of the installation and the volume of traffic should ultimately determine the number of lanes. A single lane in each direction with strategically placed left and/or right turn lanes to expedite traffic flow may be adequate for most primary streets at PBA.
- Alignments that form boundaries between different land uses are preferable to alignments that transect a land use zone.
- Major facilities and building group entrance ways should have controlled access points and a limited number of curb cuts.
- At-grade intersection signal controls are ideal but may not be necessary in all circumstances. Consideration should be given to vehicular and pedestrian safety when determining whether to use traffic lights, either flashing cautionary units or alternating priority units, as well as yield signs or two-way and four-way stops.
- On-street parking is discouraged. Consideration should be given to prohibiting on-street parking during periods of peak traffic volume. Safety of passengers exiting parked cars and the effect on traffic flow are important considerations in determining when and where to allow on-street parking.
- Medians, street lighting, signage, lane marking, and plantings contribute to smooth flow of traffic.
- Curbs, gutters, and sidewalks separated from the road by a planting strip are most suited to the cantonment area and in the residential area with densities greater than two dwelling units per acre.

Primary streets at PBA may use a median to separate two-way traffic. Intersections that include at least one primary street should be concrete and able to accommodate turning truck traffic. Signal controls and left-turn lanes may be implemented where necessary. Primary street standards are depicted in Figure 3-2. Primary intersection standards are shown in Figures 3-3 and 3-4.

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3.1.2 SECONDARY STREETS

Secondary streets **s**erve as connectors between primary roads and tertiary roads and between adjacent land use zones. While typically providing less carrying capacity than primary streets, secondary streets accommodate moderate to slow traffic speeds. Additional design characteristics include the following:

- Continuous through-traffic alignment between primary roads, either straight or curvilinear based upon the design speed topography and land pattern.
- Direct access to abutting property.
- A maximum of two moving traffic lanes in each direction, undivided
- On-street parking generally prohibited.
- Street lighting, signage, and planting that reflects the moderate-to-slow speed nature of traffic and the character of the land use area they are in.

Secondary street standards are depicted in Figure 3-5 while secondary intersection standards are shown in Figures 3-6 and 3-7.

3.1.3 TERTIARY STREETS-UNPAVED ROADS

Many of the tertiary streets that connect facilities in the Explosive Area are unpaved. Unpaved roads should be designed and constructed to uphold and withstand the movement of heavy vehicles on the installation. These roads should be comprised of four layers of materials beginning with a compacted base layer with at least a 98% minimum density in accordance with American Society of Testing and Materials (ASTM) standards for laboratory compaction (D-1557). Additional, subsequent construction techniques place a 4-inch layer of graded aggregate directly on top of the subgrade to create a separation layer, with an additional 4-inch layer of open graded aggregate on top of the graded aggregate separation layer to form a drainage layer. On top of the drainage layer is a 4-inch layer of aggregate surface course. Tertiary street standards are depicted in Figure 3-8 and intersection standards would correspond with secondary intersection standards as mentioned above

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FIGURE 3-1: PBA STREET CLASSIFICATIONS

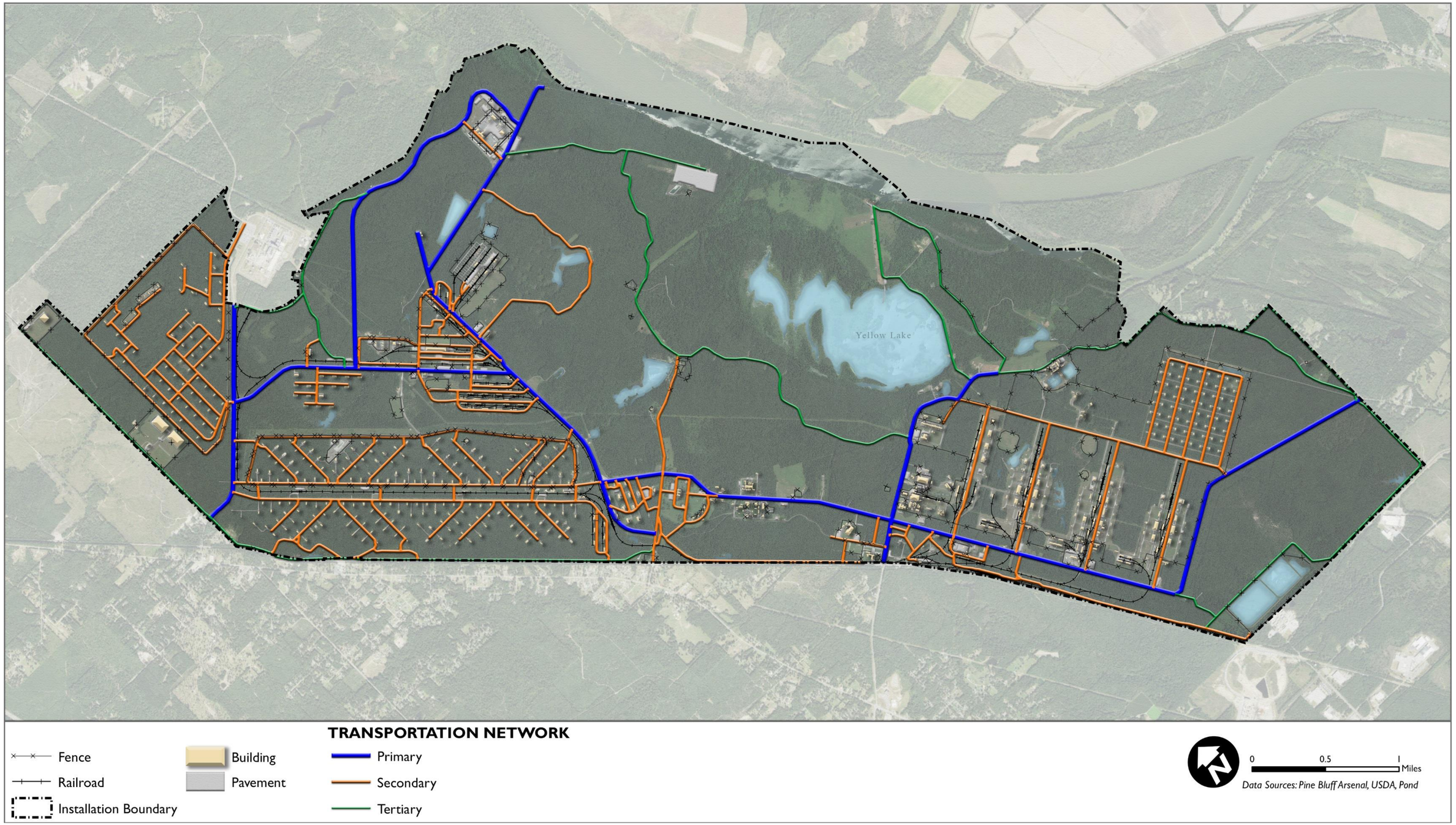

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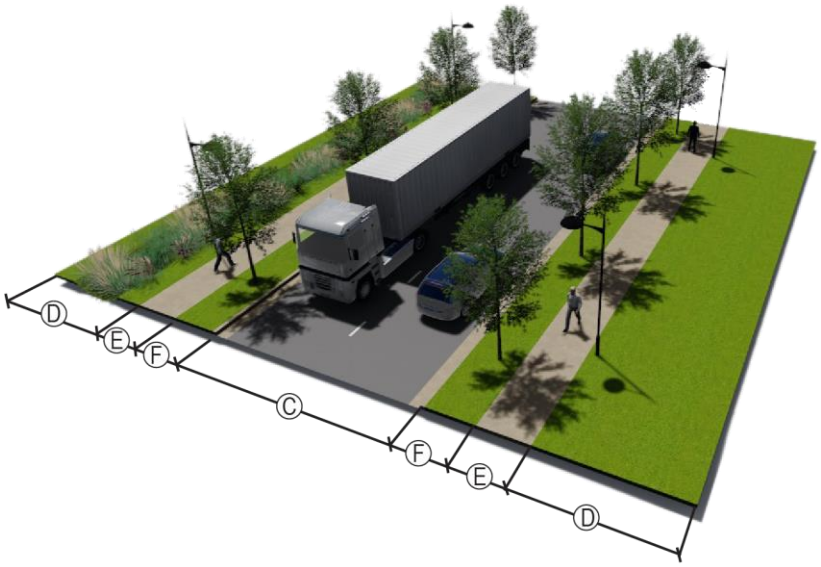
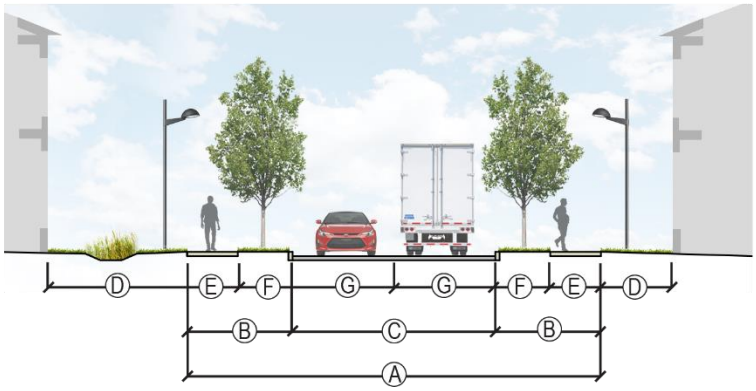
FIGURE 3-2: PRIMARY STREET STANDARD

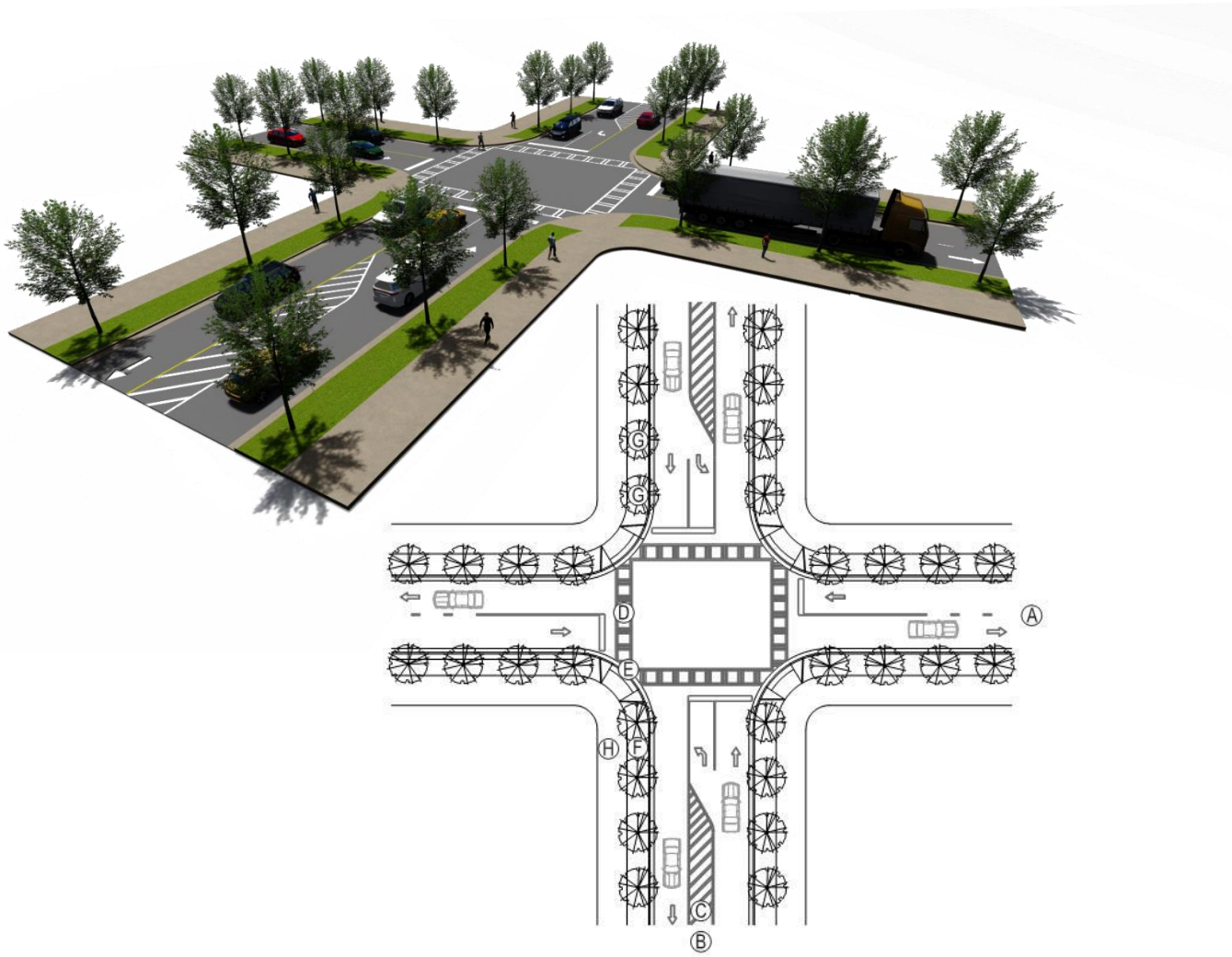




PRIMARY STREET STANDARDS			
Overall Widths		**Garrison Visual Zone**	**Mission/River Visual Zone**
ROW Width	Ⓐ	80’-0”	42’-0”
Planting Strip Width	Ⓑ	8’-0”	N/A
Curb to Curb Width	Ⓒ	42’-0”	
Lanes & Edges			
Building Setback	Ⓓ	Per AT/FP Standoff Requirements	
Sidewalk	Ⓔ	11’-0”	N/A
Planting Strip	Ⓕ	8’-0”	N/A
Traffic Lane	Ⓖ	13’-0”	
Street Trees			
Street Trees		25-35’ On Center (O.C.).	N/A
GENERAL NOTES			
Refer to landscape standards for preferred trees and shrubs in planting strips.			
All designated street speeds must be confirmed with a traffic study.			
Building setback shall be the minimum allowable AT/FP Standards.			
Zone F is the appropriate location to place trees, storm water BMPs, pedestrian amenities such as street furniture, etc. Refer to Section 4, Landscape Standards for more information.			
Some primary and secondary streets may not have street lighting, street trees, sidewalks, or pavement depending on their location.			

Note: The drawings in this document are not design/construction drawings but are presented for planning purposes to provide recommended dimensions.

FIGURE 3-3: PRIMARY INTERSECTION STANDARD, TRADITIONAL



PRIMARY INTERSECTIONS STANDARDS, TRADITIONAL			
Street Dimensions		**Garrison Visual Zone**	**Mission/River Visual Zone**
Street Width	Ⓐ	42’-0”	
Street with Median Width	Ⓑ	55’-0”	
Median Width	Ⓒ	13’-0”	
Crosswalk Dimensions			
Crosswalk Width	Ⓓ	6’-0” to 12’-0” (11’-0” Recommended)	N/A
Street Corner Radius			
Curb Radius	Ⓔ	15’-0” to Unlimited (45’-0” Recommended)	
Plant Strip Dimensions			
Planting Strip Width	Ⓕ	8’-0”	N/A
Street Tree Spacing	Ⓖ	25-35’ O.C.	N/A
Sidewalk Dimensions			
Sidewalk Width	Ⓗ	11’-0”	N/A

Note: The drawings in this document are not design/construction drawings but are presented for planning purposes to provide recommended dimensions.

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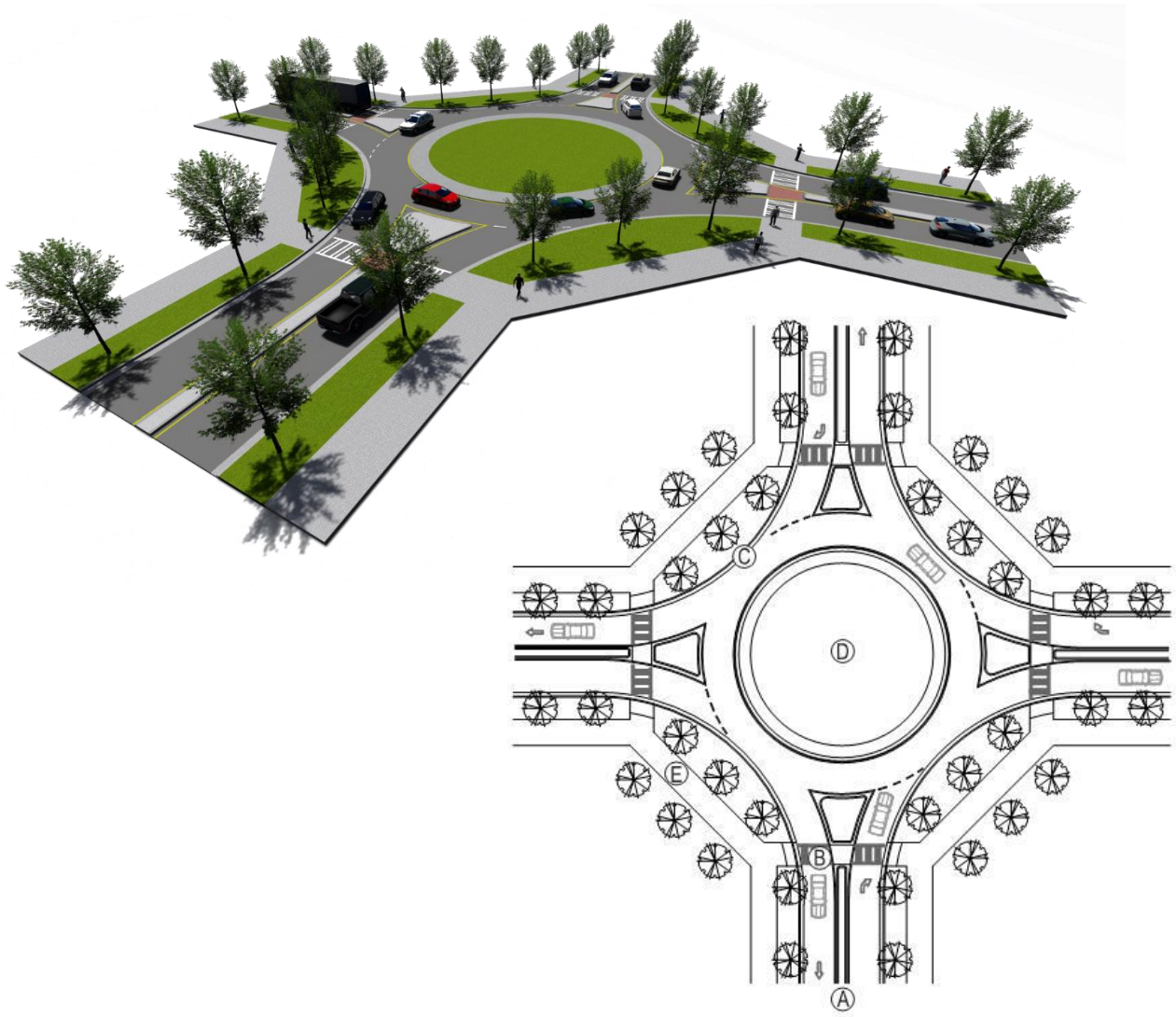
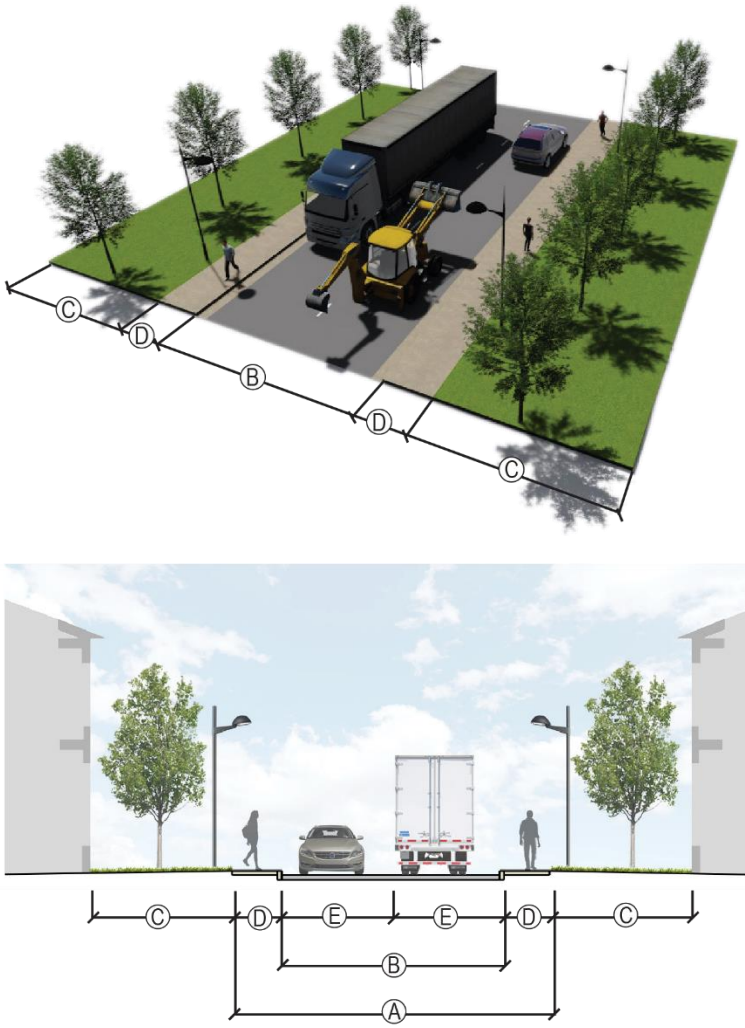
FIGURE 3-4: PRIMARY INTERSECTION STANDARD, TRAFFIC CIRCLE



PRIMARY INTERSECTIONS STANDARDS, TRAFFIC CIRCLE			
Overall Widths		**Garrison Visual Zone**	**Mission/River Visual Zone**
Street Width	Ⓐ	13’-0”	
Crosswalk Dimensions			
Crosswalk Dimensions	Ⓑ	11’-0”	N/A
Street Corner Radius			
Curb Radius	Ⓒ	45’-0” to Unlimited (75’-0” Recommended)	
Central Island			
Landscape area (central island)	Ⓓ	45’-0” to 90’-0”	105’-0” to 150’-0”
Sidewalk Dimensions			
Sidewalk Width	Ⓔ	11’-0”	N/A

Note: The drawings in this document are not design/construction drawings but are presented for planning purposes to provide recommended dimensions.

FIGURE 3-5: SECONDARY STREET STANDARD, TWO-WAY, PAVED



SECONDARY STREET STANDARDS, TWO-WAY, PAVEDED			
Overall Widths		**Garrison Visual Zone**	**Mission/River Visual Zone**
ROW Width	Ⓐ	48’-0”	22’-0”
Curb to Curb Width	Ⓑ	38’-0”	22’-0”
Lanes & Edges			
Building Setback	Ⓒ	Per AT/FP Standoff Requirements	
Sidewalk	Ⓓ	5’-0”	N/A
Traffic Lane	Ⓔ	11’-0”	11’-0”
Street Trees			
Street Trees		25-35’ O.C.	N/A
GENERAL NOTES			
Refer to landscape standards for preferred trees and shrubs in planting strips.			
All designated street speeds must be confirmed with a traffic study.			
Building setback shall be the minimum allowable AT/FP Standards.			
Depending on their location, primary/secondary streets may not have street lighting, street trees, sidewalks, or pavement.			

Note: The drawings in this document are not design/construction drawings but are presented for planning purposes to provide recommended dimensions.

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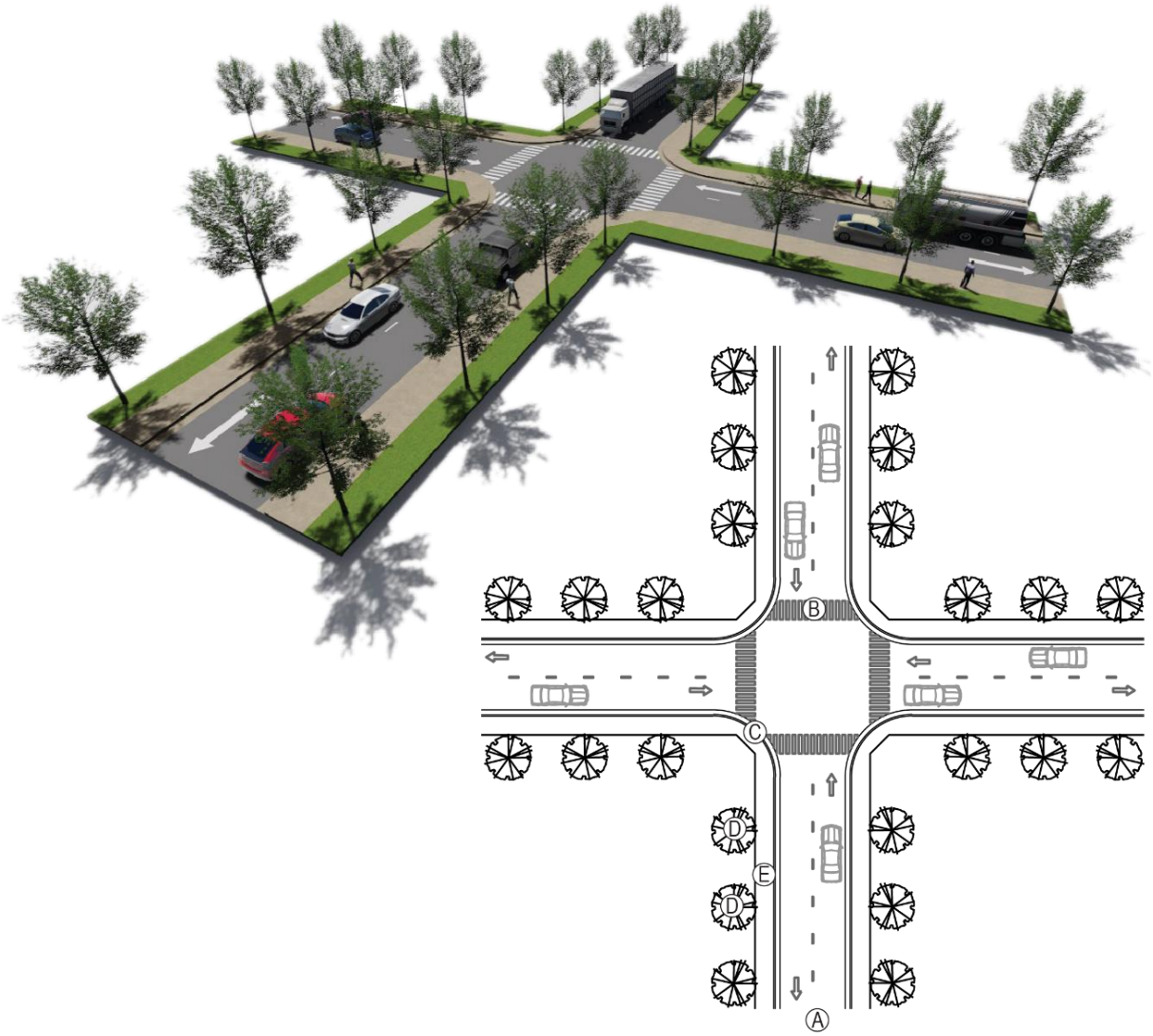
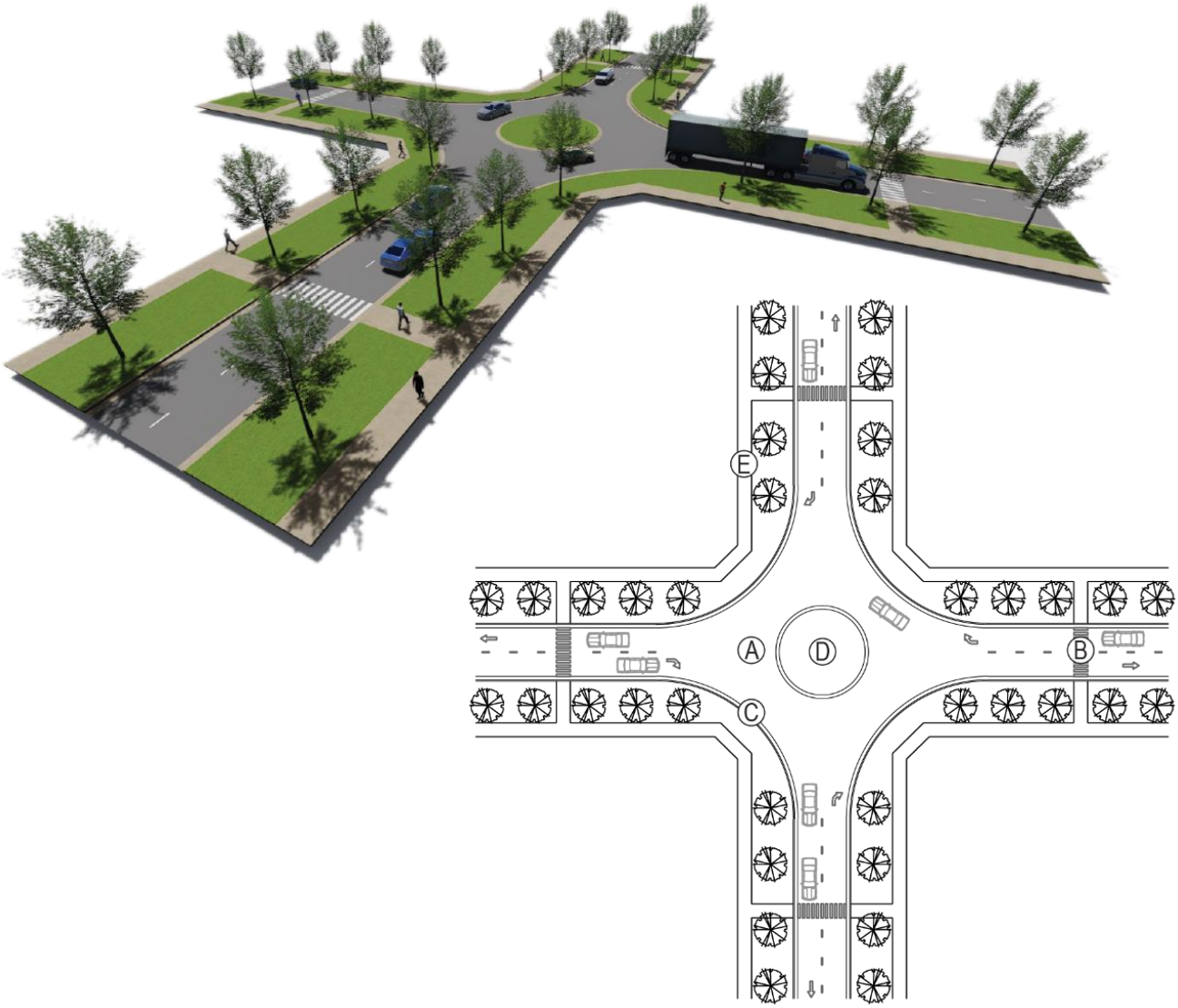
FIGURE 3-6: SECONDARY INTERSECTION STANDARD, TRADITIONAL



SECONDARY INTERSECTION STANDARDS, TRADITIONAL		
Street Dimensions	**Garrison Visual Zone**	**Mission/River Visual Zone**
Street Width Ⓐ	11’-0”	
Crosswalk Dimensions		
Crosswalk Width Ⓑ	6’-0”	N/A
Street Corner Radius		
Curb Radius Ⓒ	15’-0” to Unlimited (45’-0” Recommended)	
Plant Strip Dimensions		
Street Tree Spacing Ⓓ	25-35’ O.C.	N/A
Sidewalk Dimensions		
Sidewalk Width Ⓔ	6’-0”	N/A

Note: The drawings in this document are not design/construction drawings but are presented for planning purposes to provide recommended dimensions.

FIGURE 3-7: SECONDARY INTERSECTION STANDARD, TRAFFIC CIRCLE



SECONDARY INTERSECTION STANDARDS, TRAFFIC CIRCLE			
Street Dimensions		**Garrison Visual Zone**	**Mission/River Visual Zone**
Street Width in Circle	Ⓐ	17’-0” to 22’-0” (18’-0” Recommended)	
Crosswalk Dimensions			
Crosswalk Dimensions	Ⓑ	6’-0”	N/A
Street Corner Radius			
Curb Radius	Ⓒ	50’-0” to 60’-0” (55’-0” Recommended)	
Central Island			
Landscape area (central island)	Ⓓ	45’-0” to 90’-0”	105’-0” to 150’-0”
Sidewalk Dimensions			
Sidewalk Width	Ⓔ	6’-0”	N/A

Note: The drawings in this document are not design/construction drawings but are presented for planning purposes to provide recommended dimensions.

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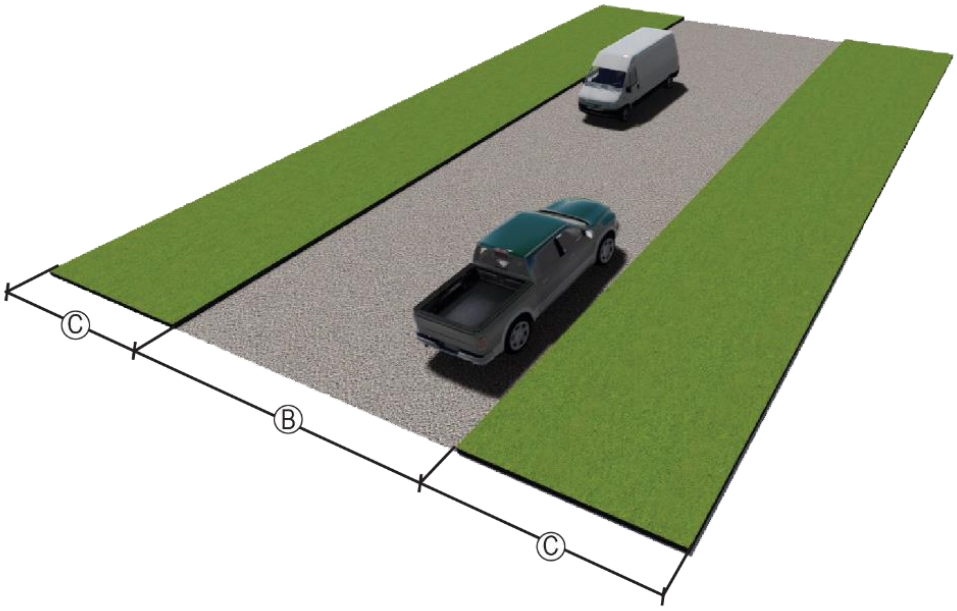
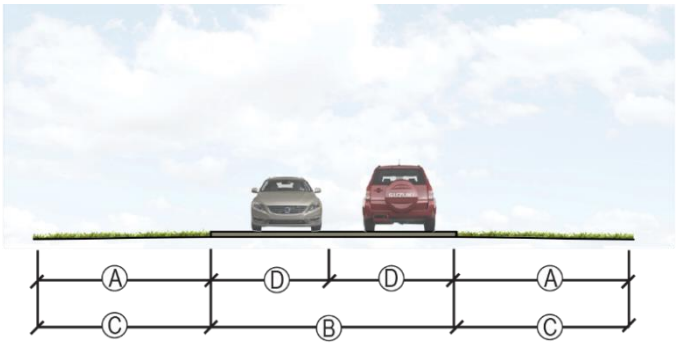
FIGURE 3-8: TERTIARY STREET STANDARD, TWO-WAY, UNPAVED





SECONDARY STREET, TWO-WAY, UNPAVED				
Overall Widths		**Garrison/Mission/ River Visual Zone**		
ROW Width	Ⓐ	22’-0”		
Curb to Curb Width	Ⓑ	22’-0”		
Lanes & Edges		**Minimum**	**Maximum**	**Recommended**
Building Setback	Ⓒ	Per AT/FP Standoff Requirements		
Traffic Lane	Ⓓ	11’-0”		
GENERAL NOTES				
All designated streets speeds must be confirmed with traffic study.				
Building setback shall be the minimum allowable AT/FP Standards.				
Unpaved road to be gravel or hardstand.				

Note: The drawings in this document are not design/construction drawings but are presented for planning purposes to provide recommended dimensions.

3.2 PEDESTRIAN STANDARDS

In addition to providing vehicular access throughout the installation, streets should, where feasible and appropriate, accommodate pedestrian circulation. Roadways and pedestrian walkways will be designed to provide hierarchy of circulation design and carrying capacity. Functionally, a hierarchical network can be created that separates incompatible types of traffic. This separation of traffic promotes sustainability because it results in more efficient energy consumption.

Pedestrian sidewalks, walkways, street trees, signage, street furniture, and crosswalks allow safe and comfortable passage between destinations. Areas of the installation containing multiple destinations within one half mile of each other should incorporate these elements in the redevelopment of primary and secondary roadways. Continuous sidewalks should be installed on both sides of the street. Pedestrian walkways should be used to provide direct pedestrian access between sidewalks, building entrances, parking lots, and other destinations.

Sidewalks should be separated from the roadway by a curb and can accommodate moderate changes in grade. In addition, ADA requirements should be adhered to at PBA.

Visually, the circulation hierarchy can be reinforced through design, planting, signage, and lighting to promote a more attractive visual experience and promote a sense of orientation.

- Provide walkways that are designed at a pedestrian scale to be comfortable and pleasant.
- Pedestrian walkways should be covered where buildings are located closely together to guard pedestrians from inclement weather.
- Provide safe and secure pedestrian facilities that are separate from vehicular and railroad traffic.
- Provide accessibility to all users, including physically impaired or challenged persons. All street and driveway crossings shall be ramped, marked, and accessible to persons with disabilities in accordance with requirements of the Uniform Federal Accessibility Standards (UFAS).
- Provide links to major attractions and generators of pedestrian traffic.
- Provide design consistency throughout the walkway with adjacent drainage.
- Design and locate walkways and bicycle paths to fit physical environment, providing a comfortable pedestrian experience, limiting conflicts with vehicular traffic.
- Wherever possible, provide a designated right-of-way for bike traffic, separate from vehicular and pedestrian routes.
- Locate bikeway crossings away from vehicular intersections with crossings marked on the street pavement.
- When separate bicycle Rights-Of-Way (ROW) are not feasible, designate bikeway lanes with paint on the right-hand side of roadways.
- Bikeways should never share undesignated space with roadways except at crossings.

Bike rack at Building 17500.

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3.3 PARKING STANDARDS

3.3.1 PARKING LOT LOCATION AND DESIGN

Parking areas can be designed and enhanced to provide a more pleasing impact and a more comfortable physical experience for the user. The following design techniques should be used to create functionally and aesthetically pleasing parking lots.

- Locate small parking lots between and behind buildings to reduce the visual impact of surface parking and encourage a more walkable Visual Zone.
- Locate parking lots on relatively level areas to avoid excessive cut and fill.
- Design parking lots to be efficient in the design and placement of access drives and parking spaces. All drives providing direct access to parking spaces should provide parking on both sides of the drive.
- Provide planting areas at the ends of all rows of parking spaces. Provide islands with trees within the main parking lot to soften the visual expanse of the parking lot and provide shade and/or wind breaks.
- Use natural topography and existing trees to visually screen parking areas from adjacent facilities and other parking bays.
- Design parking lots to preserve significant existing trees. Provide a planting area around the tree that is large enough to allow water to the root system.
- Parking lots should be paved with concrete, asphalt, or other paving material and in compliance with OSHA Subpart D.
- Parking structures are permitted, both below grade and above grade, for parking capacity in densely developed areas where available land is scarce. Parking structures are expensive, but they provide many benefits, including reduced land use, reduced visual impact, and protection of vehicles from inclement weather. If parking structures are built, they shall be designed to meet antiterrorism requirements.
- Berms or swales between buildings and parking areas or roads are preferred as they allow for passive AT/FP barriers.
- Use green infrastructure, such as bioswales in parking islands; water-permeable parking should be used when possible.
- New temporary parking lots are not permitted unless necessitated by adjacent new construction or renovations. Any existing temporary parking areas should be converted to permanent lots or removed, based on a parking assessment, as funds are available.

3.3.2 PAVED NON-ORGANIZATIONAL VEHICLE PARKING (ASPHALT)

The standards listed below apply to paved non-organizational parking. Standards for non-organizational vehicles are illustrated in Figures 3-12 through 3-14.

- All parking lots will be accessible to persons with disabilities in accordance with the requirements of the UFAS, paragraph 4.1.1(5)(a). If parking spaces are provided for employees or visitors, or both, then accessible spaces shall be provided in conformance with the required minimum number of accessible spaces.
- For initial planning and programming, allocate 400 SF of parking lot area per car. The total provides adequate minimum space for the parking spaces, access drives, and planting islands that make up a parking lot. This allocation is not withstanding tactical military vehicles.
- Minimize the parking space requirements of a facility by selecting a site that will allow shared parking for related activities.

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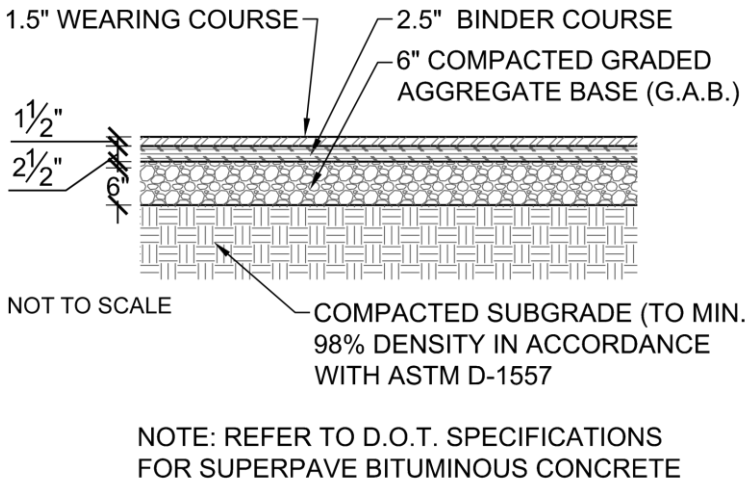
- Large parking lots are usually preferable to small lots because they allow for a dedicated vehicle space on the perimeter of the footprint. This keeps primary roads open from unnecessary congestion and roadways safer for pedestrians.
- The monotony of large parking areas can be altered using designs such as curvilinear parking or introducing large planting islands.
- Promote means of access other than vehicular by providing alternative means of access such as walkways and bikeways.
- ADA parking spaces have a recommended maximum slope of 2%.

FIGURE 3-9: ASPHALT PAVEMENT



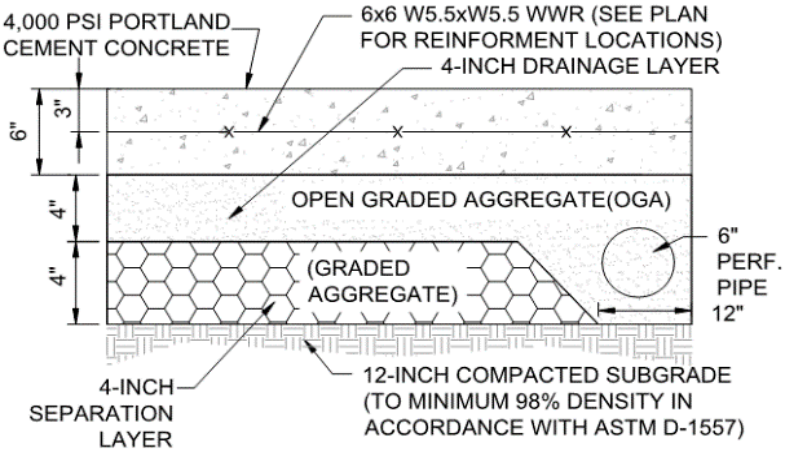
Parking utilized for asphalt parking begins with 12-inch of compacted subgrade to min. 98% density in accordance with ASTM-D1557, followed by a 6-inch layer of graded aggregate base, 2.5-inch binder course, and 1.5-inch wearing course. See Figure 3-9.

3.3.3 PAVED ORGANIZATIONAL VEHICLE PARKING (CONCRETE)

Parking utilized for organizational purposes begins with a very similar construction process as that used for non-organizational parking. Below the surface layer, all aspects of the two parking types are identical, with 1-foot of compacted subgrade followed by 4-inch layers of graded aggregate and open graded aggregate. The difference between non-organizational parking requirements and heavy vehicle parking requirements includes the surface layer being composed of 6-inches of concrete as opposed to 4-inches of asphalt.

Heavy tactical vehicle parking should provide positive surface drainage with a 1% minimum slope in the direction of drainage. Maximum pavement slope shall be 2%. Heavy tactical vehicle parking is designed to have an extreme weight bearing capacity used for large organizational equipment.

FIGURE 3-10: PORTLAND CEMENT CONCRETE PAVEMENT (PCCP)



NOTE: OGA SHALL BE STABILIZED BY EITHER CEMENT, BITUMINOUS, OR CHOKE STONE PER SPECIFICATION 32 11 10. SEPARATION LAYER SHALL CONFORM TO REQUIREMENTS IN SPECIFICATION 32 11 16.16.

NOT TO SCALE

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The first construction technique used in the creation of this parking type is a 12-inch compacted subgrade layer in accordance with ASTM D-1557 standards followed by 4-inch layers of graded aggregate and open graded aggregate. The top layer of the heavy tactical vehicle parking is composed of 4,000 PSI Portland cement concrete with embedded reinforcement bar (rebar) placed in a mesh-like fashion. See Figure 3-10.

3.3.4 UNPAVED ORGANIZATIONAL VEHICLE PARKING REQUIREMENTS (GRAVEL / HARDSTAND)

Unpaved organizational vehicle parking at PBA should be comprised of four layers of materials. This type of vehicle parking is used for both organizational and Privately-Owned Vehicle (POV) parking areas (see Figure 3-11). The construction technique used for unpaved parking areas begins with a compacted base layer with at least 98% minimum density in accordance with ASTM standards for laboratory compaction (D-1557).

Following the compaction process, a 4-inch section of graded aggregate is placed directly above the subgrade to create a separation layer and another 4-inch section of open graded aggregate is placed above the separation layer to form a drainage layer. The top layer of the unpaved vehicle parking is composed of a 4-inch layer of aggregate surface course. A diagram of the unpaved vehicle parking is shown in Figure 3-15.

Heavy vehicle parking should provide positive surface drainage with a 1% minimum slope in the direction of drainage. Maximum pavement slope shall be 2%. Heavy vehicle parking is designed to have an extreme weight bearing capacity used for large organizational equipment.

The first construction technique used in the creation of this parking type is a 12-inch compacted subgrade layer in accordance with ASTM D-1557 standards followed by a 4-inch layer of graded aggregate base and 4-inch open graded aggregate base. The top layer of the is a 4-inch aggregate surface course.

FIGURE 3-11: AGGREGATE SURFACING

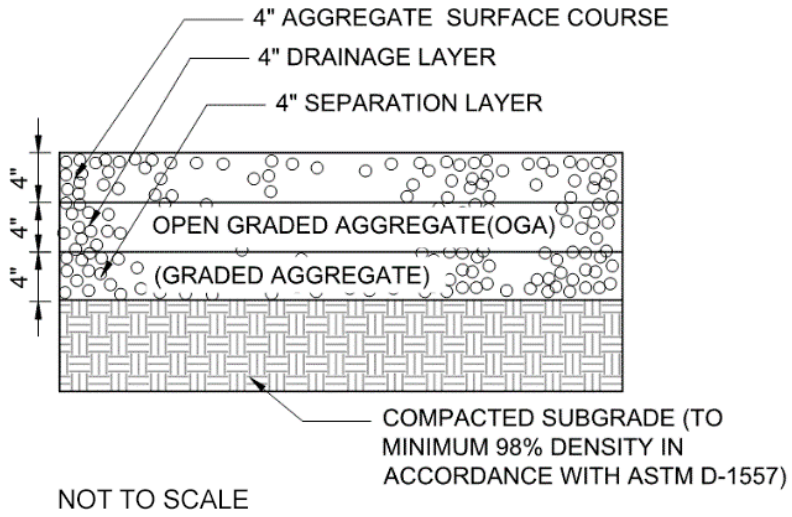

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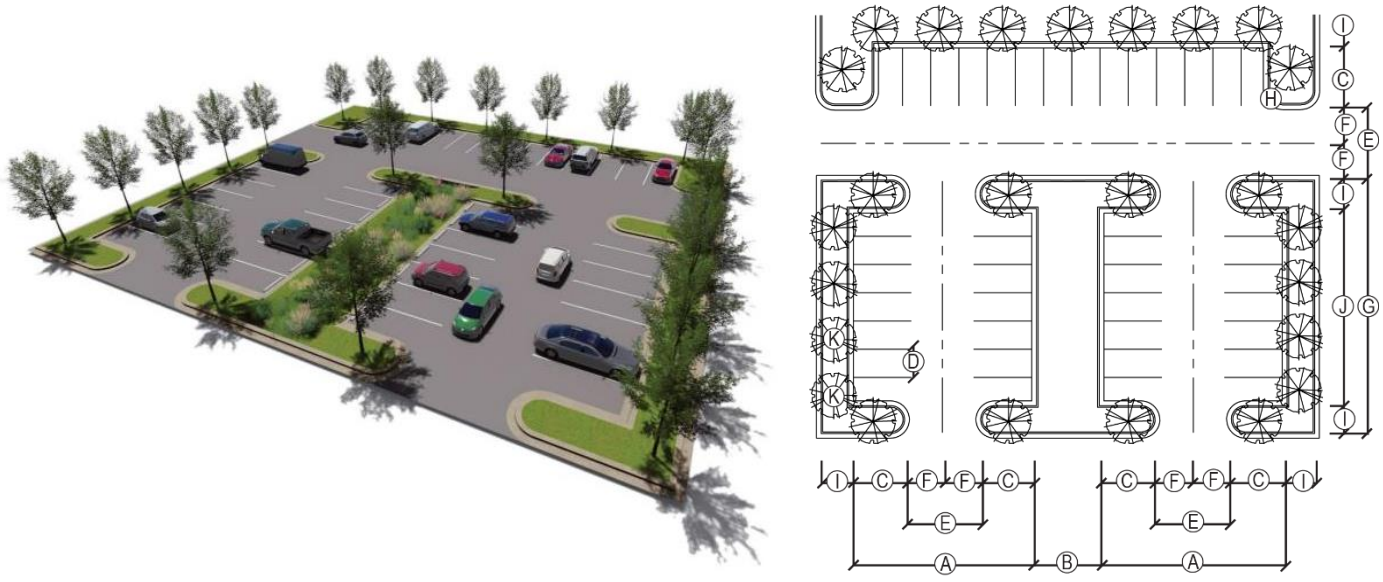
FIGURE 3-12: PARKING STANDARD, MULTI-BAY, PAVED



PARKING STANDARDS, MULTI-BAY, PAVED				
Overall Widths		**Minimum**	**Maximum**	**Recommended**
Parking Bay Widths	Ⓐ	60’-0”	70’-0”	60’-0”
Center Island Widths	Ⓑ	8’-0”	16’-0”	12’-0”
Parking Dimensions		**Minimum**	**Maximum**	**Recommended**
Stall Length	Ⓒ	18’-0”	22’-0”	18’-0”
Stall Width	Ⓓ	8’-0”	11’-0”	9’-0”
Access Overall Width	Ⓔ	24’-0”	26’-0”	24’-0”
Access Lane Width	Ⓕ	12’-0”	13’-0”	12’-0”
Island Dimensions		**Minimum**	**Maximum**	**Recommended**
Island Overall Length	Ⓖ	25’-0”	228’-0”	81’-0”
Island Radius	Ⓗ	3’-0”	15’-0”	4’-6”
Island Width	Ⓘ	8’-0”	24’-0”	9’-0”
Parking Stalls Length	Ⓙ	9’-0”	180’-0”	63’-0”
Tree Spacing	Ⓚ	25’ O.C.	35’ O.C.	25’ O.C.
GENERAL NOTES				
Refer to landscape standards for preferred trees and shrubs in planting islands.				
All designated street speeds must be confirmed with a traffic study.				
Building setbacks shall be the minimum allowable AT/FP Standards.				
No angled parking.				
Zones I and B are the appropriate location to place trees, storm water BMPs, pedestrian amenities such as street furniture, etc. Refer to Section 4, Landscape Standards for more information.				

Note: The drawings in this document are not design/construction drawings but are meant for planning purposes to provide recommended dimensions.

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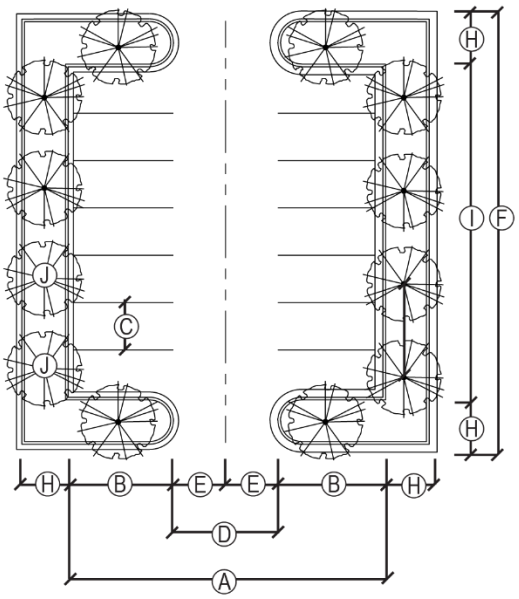
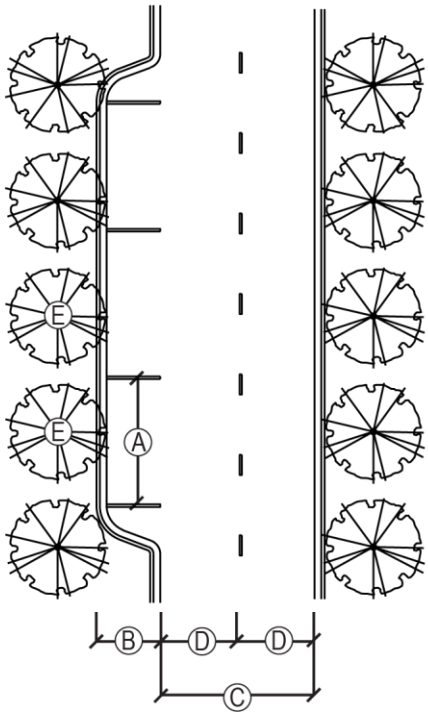
FIGURE 3-13: PARKING STANDARD, SINGLE-BAY, PAVED



PARKING STANDARDS, SINGLE-BAY, PAVED				
Overall Widths		**Minimum**	**Maximum**	**Recommended**
Parking Bay Widths	Ⓐ	54’-0”	68’-0”	56’-0”
Parking Dimensions		**Minimum**	**Maximum**	**Recommended**
Stall Length	Ⓑ	18’-0”	22’-0”	18’-0”
Stall Width	Ⓒ	8’-0”	11’-0”	9’-0”
Driving Dimensions		**Minimum**	**Maximum**	**Recommended**
Access Overall Width	Ⓓ	18’-0”	24’-0”	20’-0”
Access Lane Width	Ⓔ	9’-0”	12’-0”	10’-0”
Island Dimensions		**Minimum**	**Maximum**	**Recommended**
Island Overall Length	Ⓕ	25’-0”	228’-0”	81’-0”
Island Radius	Ⓖ	3’-0”	15’-0”	4’-6”
Island Width	Ⓗ	8’-0”	24’-0”	9’-0”
Parking Stalls Length	Ⓘ	9’-0”	180’-0”	63’-0”
Tree Spacing	Ⓙ	25’ O.C.	35’ O.C.	25’ O.C.
GENERAL NOTES				
Zone J is the appropriate location to place trees, storm water BMPs, pedestrian amenities such as street furniture, etc. Refer to Section 4, Landscape Standards for more information.				
All designated street speeds must be confirmed with a traffic study.				
Buildings setback shall be the minimum allowable AT/FP Standards.				
All roadways shall be designed in accordance with the safe and sound engineering standards American Association of State Highway Officials (AASHO), Federal Highway Administration (FHA), Department of Transportation (DOT), UFC, and DoD Criteria.				
Trees shall be planted such that a minimum of 70% of surface area is covered within 15 years (see BES for specific percentages).				

Note: The drawings in this document are not design/construction drawings but are meant for planning purposes to provide recommended dimensions.

FIGURE 3-14: PARKING STANDARD, ON-STREET, PARALLEL



PARKING STANDARDS, ON STREET, PARALLEL				
Parking Dimensions		**Specifications**		
Stall Length	Ⓐ	22’-0”		
Stall Width	Ⓑ	8’-0”		
Driving Dimensions		**Specifications**		
Travel Lane Overall Width	Ⓒ	≥24’-0”		
Travel Lane Width	Ⓓ	≥12’-0”		
Tree Dimensions		**Minimum**	**Maximum**	**Recommended**
Tree Spacing	Ⓔ	25’ O.C.	35’ O.C.	25’ O.C.
GENERAL NOTES				
Zone E is the appropriate location to place trees, storm water BMPs, pedestrian amenities such as street furniture, etc. Refer to Section 4, Landscape Standards for more information.				
All designated street speeds must be confirmed with a traffic study.				
Buildings setback shall be the minimum allowable AT/FP Standards.				
All roadways shall be designed in accordance with the safe and sound engineering standards AASHO, FHA, DOT, UFC, and DoD Criteria.				
Trees shall be planted such that a minimum of 70% of surface area is covered within 15 years (see BES for specific percentages).				
Use this module in parking areas that have a moderate to high turn-over rate				
Space requirement: 176 square feet per vehicle.				

Note: The drawings in this document are not design/construction drawings but are meant for planning purposes to provide recommended dimensions.

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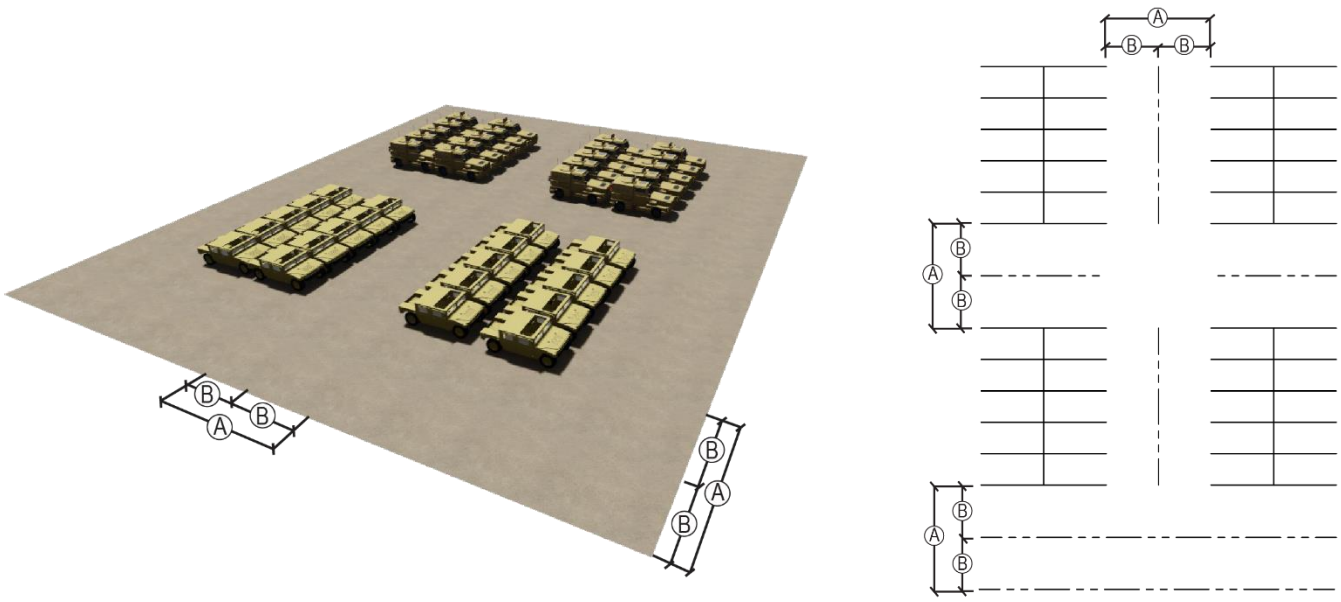
FIGURE 3-15: PARKING STANDARD, ORGANIZATIONAL, PAVED/UNPAVED



ORGANIZATIONAL PARKING STANDARDS, PAVED/UNPAVED			
Aisles	**Minimum**	**Maximum**	**Recommended**
Overall Widths Ⓐ	30’-0”	45’-0”	30’-0”
Lane Width Ⓑ	15’-0”	22’-6”	15’-0”
GENERAL NOTES			
Aisles should only be widened to 45’ when parked vehicles are longer than 18’.			
Unit integrity should be maintained at the company level when possible.			
Parking stalls are shown on plan but will not be laid out on the pavement, since vehicles inventory and location will vary over time.			
If directed by the User, actual spaces may be indicated on the pavement.			
Building setback shall be the minimum allowable AT/FP Standards.			

Note: The drawings in this document are not design/construction drawings but are meant for planning purposes to provide recommended dimensions.

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3.3.5 TRANSPORATION STANDARDS

At PBA, transportation design elements are determined by visual zone location. Table 3-1 provides these designations.

TABLE 3-1: TRANSPORTATION DESIGN ELEMENTS BY VISUAL ZONE

TRANSPORTATION DESIGN ELEMENT	TRANSPORATATION STANDARDS VISUAL ZONES		
	MISSION	GARRISON	RIVER
On-Street Diagonal Parking	🔴	🟡	🟡
On-Street Parallel Parking	🔴	🟡	🟡
Small Surface Parking Lots Accompanying Building (less than 30 spaces)	🔴	🟢	🟢
Large Surface Parking Lots Accompanying Building (more than 30 spaces)	🟢	🟢	🟢
Multi-Story Parking Structures	🟡	🟡	🟡
Military Equipment Parking (MEP) / Hardstand / Open Storage	🟢	🟡	🟡
Paved Roads	🟢	🟢	🟢
Unpaved Roads	🔴	🟡	🟢
Designated Bike Lanes	🔴	🟡	🟡
Pedestrian Signals, Crosswalks, and Pavement	🟢	🟢	🟢

🟢 *Permitted* 🟡 *Permitted with Restrictions* 🔴 *Restricted*

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4 LANDSCAPE STANDARDS

Landscape standards show the appropriate type and placement of landscape elements, which may include natural landscape features (e.g., trees, ground cover, etc.), man-made landscape features (e.g., street furniture, signage, lighting, etc.), and landscape-related force protection standards. Landscape standards identify the installation's landscape theme(s), addressing both design intent, allowable plant materials, and site furnishing elements. At a minimum, these standards will address street tree placement and type.

These standards address the selection, placement, and maintenance of trees, shrubs, and ground cover on the installation. The visual image conveyed by a military installation is defined not just by architectural character and site organization, but also by an attractive, organized landscape design. The presence of plant material on the installation greatly enhances the visual character and environmental quality of the installation. Plantings add an element of human scale to open spaces and can be used functionally to screen undesirable views, buffer winds, reinforce the hierarchy of the circulation system and/or provide a visual transition between dissimilar land uses.

4.1 LANDSCAPE INTENT

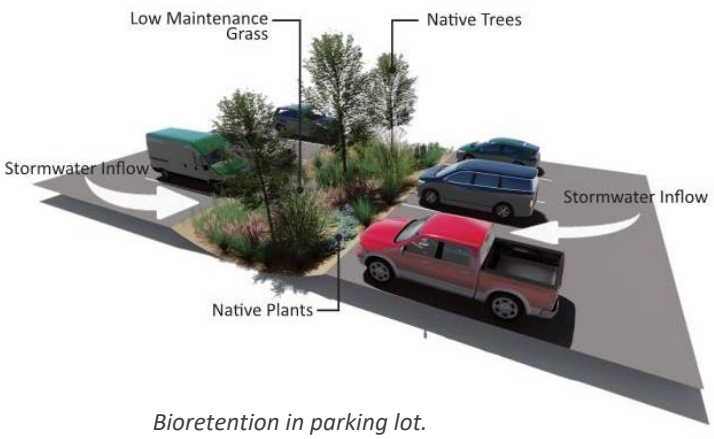
The overall objective of the use of plant material within the installation is to improve the physical and psychological well-being of the people who live and work on the installation. This is achieved through the following objectives:

- Preserve and enhance aesthetics and environmental/ecological health of the installation.
- Blend the built environment with the natural environment.
- Provide scale and comfort to pedestrian environments.
- Reinforce the hierarchy of the circulation system.
- Screen unsightly views or elements.
- Buffer incompatible land uses.
- Minimize maintenance by using native plant materials that require less maintenance to survive.
- Enhance AT/FP capabilities where possible.
- Provide water quality and air quality through natural systems.

4.2 SUSTAINABLE LANDSCAPE DEVELOPMENT GUIDELINES

The use of plant material on the installation promotes the sustainability of the development. Trees, shrubs, groundcover and vines provide aesthetic appeal as well as preservation of fauna and flora, energy conservation, climate modification, erosion control, air purification, and noise abatement.

Bioretention next to roadway.



Bioretention in parking lot.

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Bioretention Basins

Bioretention basins are ideal for slowing and treating on-site stormwater runoff. Typically, this consists of a planted depression topped with a layer of mulch and vegetation that is tolerant to short-term flooding.

Design factors include:

- Basin design (e.g., soil type, drainage, groundwater table, slope)
- Location in the treatment path
- Plant material selection and placement
- On-going management

Benefits include:

- Reduced heat islands
- Reduced building energy use
- Conserve/restore native plant communities
- Improved air quality
- Wildlife habitat

Native Landscape Design

Native plants are those that occur naturally in a region in which they evolved. Benefits of native plants include low maintenance, water conservation, provides aesthetics, helps the local climate, requires less pesticides, and promotes wildlife. Landscaping choices have meaningful effects on environment, lifestyle, and animal populations.

Xeriscape

Xeriscape is the conservation of water and energy through creative and adaptive landscape design. Picking drought-tolerant, landscape appropriate, plant species. Xeriscape landscapes provide attractive and resilient solutions that save water and are low maintenance.

4.3 LANDSCAPE DESIGN GUIDELINES

Proposed plantings must be reviewed to ensure that site conditions (e.g., soil, topography, adjacent uses, and architecture) and climatic criteria (e.g., sun, shade, and moisture requirements) are considered in the desired plant design and selection (e.g., form, texture, color, and size). The uses and users of the site must also be considered. Landscape planting plans should be approved by qualified personnel to provide quality assurance and promote design consistency within each planning standards visual zone.

The following sections present landscaping guidelines for the various locations of plant material use.

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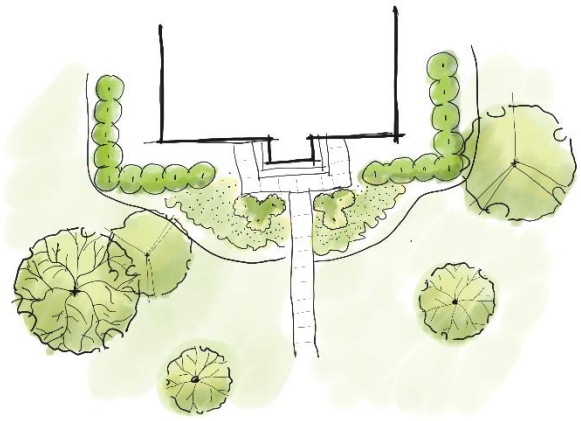
Foundation Planting

Foundation Planting provides a green background for additional plantings, adds scale and character to a building, helps to integrate the building with its surroundings, screens utilities, and helps create a sense of arrival. When developing foundation planting plans, consideration should be given to AT/FP measures. Foundation plantings should be limited to administration buildings.



Foundation planting.

- Use the architecture of the building to evaluate the planting design and selection of plants.
- Plant material should not block windows and views from interior spaces.
- Trees shall be setback from building walls to provide for mature growth and to prevent root systems from damaging the foundation.
- A symmetrical foundation planting design should be used for a symmetrical building.
- Due to the possibility of insect problems (bee stings, etc.), do not plant flowering shrubs near entrances.

Windscreen.

Windscreens and Screening

Use a combination of evergreens and deciduous trees to provide windbreak protection from prevailing winds. Windbreak plantings should be irregular in form, rather than straight and evenly spaced, to provide more effective wind control and to visually blend with the natural character of the installation.

Buffer Planting

Use primarily evergreen, and some deciduous, trees and shrubs to help contain poor views, safety, security, pollution, and noise.

Open Space Planting

These are areas of space formed by the arrangement of artificial features that create or define a use. Enhance open space areas with planting. Use a mix of evergreen, deciduous, and flowering trees. Plant the same kind of trees in massive groupings to impact the vast open areas.

Street Trees

Street tree plantings should be used to reinforce vehicular hierarchy, orient and direct traffic, provide shade, buffer pedestrians from vehicles, and enhance views. Also, in the design of a street tree planting, separate plant species may be used to identify

Buffer planting.

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distinctive details or areas of the installation for example, a land use relationship, historical district, community area, or other similar entity.

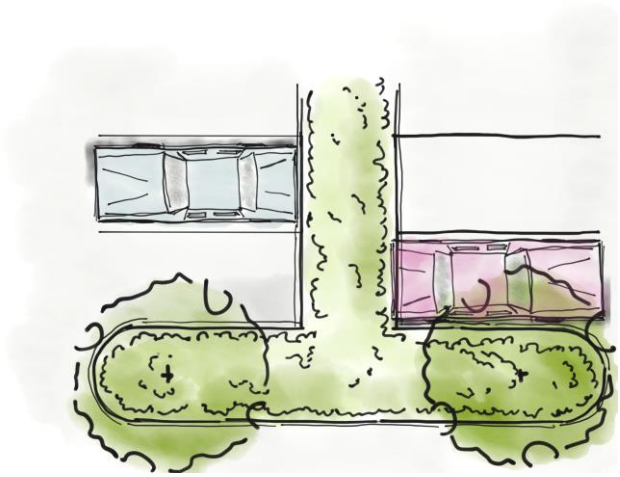
Use formal street trees in single rows to visually reinforce primary and secondary roads. Use regularly spaced and uniformly shaped deciduous trees to provide a regimented appearance. As a rule, street trees should be deciduous species, resistant to salt and root pressure, and should have a 10' to 12' high clearance between the street pavement and branch height to allow adequate clearance for pedestrian and vehicle traffic to pass unimpeded by lower branches.

No more than 10% of the street tree population should be made up of any single species, and no more than 20% made up of any tree genus. This will promote tree species diversity and help prevent the catastrophic loss of trees during outbreak of insects or disease.

The street tree layout shall be coordinated with the layout of proposed street lighting. Appropriate plant heights shall be used within sight triangles to ensure safe views from intersections. Weeping trees should not be used in locations where they may hang over the roadway or block views.

Parking Lot Planting Parking lots are often the least attractive elements on a military installation or in any development. The use of landscape plant material and earth berms or swales can greatly improve the appearance of these areas, as well as help define circulation and reduce heat gain during summer months.

- Use shade tree plantings at parking lots to reduce glare and to moderate ambient air temperatures on the lot. Optimum spacing of parking lot shade trees is 35-40 feet on center.
- Choose trees and shrubs that require minimum maintenance and will not litter the parking area with fruits or nuts.
- Consider sight distances near entrances and exits when selecting and placing plant material.
- Plant selection shall be made with consideration for the conditions in which they will be planted and expected to grow.
- Use a mix of evergreen and deciduous plant material to screen parking areas from adjacent uses.



Parking lot shade trees reducing parking lot heat island effect.

Environmental Control Planting

When properly placed, plants can provide environmental benefits, as well as address visual concerns.

- Use deciduous trees and shrubs at courtyards, buildings, and along streets to provide shade, to moderate temperatures and reduce glare during the summer months while allowing solar exposure in the winter.
- Locate deciduous plantings on the southeast and southwest corners of buildings or courtyards to mitigate solar radiation and glare due to heat build-up and lower sun angles in the mid-morning and late afternoon hours.
- Use mixed massing of deciduous shrubs and evergreen trees and shrubs to provide sound control along primary and secondary roads.

Image Planting

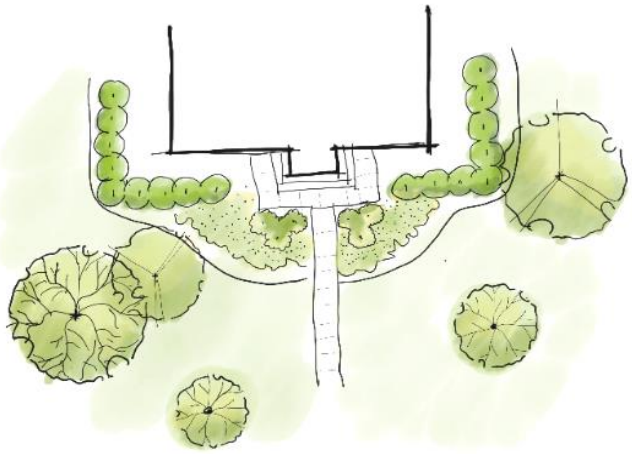
The image of the installation is formed by the visual impressions that exist within the installation. The primary locations of highly visible images are the main gate, along primary circulation systems, and at areas of high concentrations of people. Features such as signs, statues, static displays, and other primary visual images can be improved using trees, shrubs, and ground cover.

Entry and directional signage should be prominent along primary streets.

Entrance Landscaping

The entrances and streetscapes into the installation are areas to place landscaping that will develop a strong visual image and provide visual interest during all four seasons. Landscape materials and planting areas should be proportional in scale to the hierarchy of the street on which they are located.

Landscaping must be integrated with AT/FP requirements. Low shrubs, groundcover, annual/perennial plants and canopy trees provide seasonal interest as well as maintain views required to ensure force protection measures. Large evergreen trees are discouraged in these locations because they may obstruct sightlines and impact successful force protection. Adequate lines of sight must be maintained for guard personnel to observe vehicular and pedestrian traffic approaching the gate.



Foundation plantings provide a second layer of security.

Monumental/Landmark Planting

Focal points and landmarks are elements within the landscape, either man-made or natural, that give one a sense of place and provide orientation. Focal points may also have significant historical, social, or philosophical significance. Landscape at focal points should enhance, reinforce and direct attention; it should not distract or overwhelm from the focal point. Consider mature size, shape and overall visual effect throughout the year of plant material.

Anti-Terrorism/Force Protection Considerations

The presence of vegetation on an installation can have both beneficial and detrimental impacts on security. The selection and placement of landscape plant material on Army Installations is an integral element in the provision of protective measures to reduce the threat of terrorism.

Proper selection and placement of trees and shrubs can be utilized to provide visual screening without creating concealment for covert activity. The landscape architect is responsible for tree placement and should work closely with installation force protection experts to design a landscape plan that provides visual screening without compromising antiterrorism measures.

The plant material must allow building occupants to see out but must not allow outside forces to monitor interior activity. The landscape architect should incorporate the following aspects into the design:

- Avoid conditions within 10 meters (33 feet) of inhabited structures that permit concealment of aggressors or obscure the view of objects or packages 150 millimeters (mm), or six inches, in height from the view of security personnel. This results in the placement of shrubs and trees that are loose rather than dense in growth habit and possess multiple small stems rather than a single trunk that will obscure a 150 mm (six-inch) package.
- Vegetation groupings provide reduction of blast effect.
- Plant material selection and placement shall minimize potential hiding places for bombs and aggressors.
- Provide vegetation screens for play areas and outdoor recreation areas to obscure from off installation view.
- Use trees to obscure sight lines of on-installation buildings from off-installation buildings.

4.3.1 LANDSCAPE AND STREETSCAPE STANDARDS

At PBA, landscape and streetscape design elements are determined by visual zone location. Table 4-1 provides these designations.

TABLE 4-1: LANDSCAPE DESIGN ELEMENTS BY VISUAL ZONE

LANDSCAPE DESIGN ELEMENT	PLANNING STANDARDS VISUAL ZONE		
	MISSION	GARRISON	RIVER
Street Trees	🔴	🟢	🟢
Landscape Medians	🟡	🟢	🟢
Foundation Landscaping	🔴	🟡	🟢
Ornamental Planters	🟡	🟢	🟢
Outdoor Furniture (benches, picnic tables, etc.)	🟡	🟢	🟢
Bike Rack / Storage	🟡	🟢	🟢
Pedestrian Lighting	🟡	🟢	🟢
Pavilions / Shelters	🟡	🟢	🟢

🟢 *Permitted* 🟡 *Permitted with Restrictions* 🔴 *Restricted*

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4.4 PLANT PALLETTE AND CATEGORIES

The plant palette and categories are designed to help the designer choose the best plant for each particular set of design requirements. The plants that appear on the palette and in the categories were selected for their hardiness and their ability to survive in this geographical area. To use them effectively, the design requirements must be well defined for the specific site.

A select group of plant materials has been divided into the following categories:

- Canopy Trees
- Understory Trees
- Shrubs
- Groundcover and Vines

Within the plant categories, there are three leaf type subsets:

- Deciduous
- Evergreen
- Persistent

On the palette, the plants appear in alphabetical order by their botanical name, followed by their common name, plant characteristics, cultural information, recommended use, and miscellaneous notes. Plants for landscaping and/or xeriscaping on PBA should be chosen from the following plant palette. There are a wide variety of plants available in all size/functionality categories, so there shall be no substitutions of other plants not included in this list. In addition, do not substitute different species within the same genus, unless specifically stated (e.g., *Rhododendron spp., Spirea spp.*). Common and scientific/botanical names are provided to ensure selection of proper species.

The plant palette is presented in a matrix format in Table 4-2.

Deciduous trees form an allée near recreational fields.

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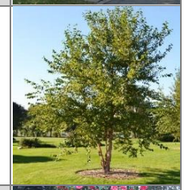
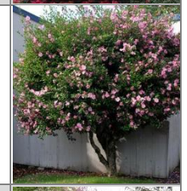
TABLE 4-2: PLANT PALETTE

PLANT GROUP [1]	SCIENTIFIC NAME	COMMON NAME	LEAF TYPE [2]	FORMS AND LINKS SPACES (20 TO 60 FEET HIGH)	PROVIDES FOCAL INTEREST (15 TO 60 FEET HIGH)	PROVIDES SHADE (20 TO 60 FEET HIGH)	PROVIDES SAFETY BUFFER AND SCREENS VIEW [3]	DEFINES SPACE (6 TO 10 FEET HIGH)	CONTROLS TRAFFIC (1 TO 6 FEET HIGH)	PROVIDES COLOR	SPECIES IN HABIT
C	*Acer rubrum 'Dummondii'*	Swamp Red Maple	D	●	●	●				●	
C	*Acer rubrum 'Red Sunset'*	Red Sunset Maple	D	●	●	●				●	
C	*Betula nigra*	River Birch	D		●		●				
U	*Camellia japonica*	Camellia	E				●	●		●	
U	*Camellia sasanqua*	Sasanqua Camellia	E				●	●		●	
U	*Cercis canadensis*	Redbud	D		●					●	

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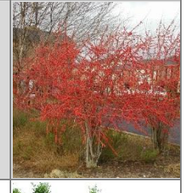
PLANT GROUP [1]	SCIENTIFIC NAME	COMMON NAME	LEAF TYPE [2]	FORMS AND LINKS SPACES (20 TO 60 FEET HIGH)	PROVIDES FOCAL INTEREST (15 TO 60 FEET HIGH)	PROVIDES SHADE (20 TO 60 FEET HIGH)	PROVIDES SAFETY BUFFER AND SCREENS VIEW [3]	DEFINES SPACE (6 TO 10 FEET HIGH)	CONTROLS TRAFFIC (1 TO 6 FEET HIGH)	PROVIDES COLOR	SPECIES IN HABIT
U	*Cornus florida*	Flowering Dogwood	D		●					●	
U	*Crataegus marshallii*	Parsley Hawthorn	D				●	●		●	
U	*Crataegus opaca*	Mayhaw	D				●	●		●	
U	*Crataegus viridis*	Green Hawthorn	D				●				
C	*Fagus grandifolia*	American Beech	D	●	●	●					
C	*Fraxinus pennsylvanica*	Green Ash	D	●		●	●				
G	*Gelsemium sempervirens*	False Jasmine	E					●	●	●	

- FOR OFFICIAL USE ONLY -

PLANT GROUP [1]	SCIENTIFIC NAME	COMMON NAME	LEAF TYPE [2]	FORMS AND LINKS SPACES (20 TO 60 FEET HIGH)	PROVIDES FOCAL INTEREST (15 TO 60 FEET HIGH)	PROVIDES SHADE (20 TO 60 FEET HIGH)	PROVIDES SAFETY BUFFER AND SCREENS VIEW [3]	DEFINES SPACE (6 TO 10 FEET HIGH)	CONTROLS TRAFFIC (1 TO 6 FEET HIGH)	PROVIDES COLOR	SPECIES IN HABIT
C	*Ginkgo biloba*	Ginkgo	D	●	●	●				●	
S	*Ilex attenuate 'Fosterii'*	Foster Holly	E				●	●		●	
U	*Ilex cornuta 'Burfordii'*	Burford Chinese Holly	E	●			●	●	●	●	
S	*Ilex cornuta 'Compacta'*	Dwarf Japanese Holly	E	●			●		●		
U	*Ilex decidua*	Deciduous Holly	E	●	●		●	●	●	●	
U	*Ilex opaca*	American Holly	E	●	●		●	●		●	
U	*Ilex vomitoria*	Yaupon Holly	E	●			●		●		

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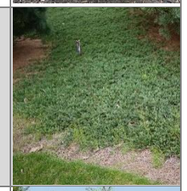
PLANT GROUP [1]	SCIENTIFIC NAME	COMMON NAME	LEAF TYPE [2]	FORMS AND LINKS SPACES (20 TO 60 FEET HIGH)	PROVIDES FOCAL INTEREST (15 TO 60 FEET HIGH)	PROVIDES SHADE (20 TO 60 FEET HIGH)	PROVIDES SAFETY BUFFER AND SCREENS VIEW [3]	DEFINES SPACE (6 TO 10 FEET HIGH)	CONTROLS TRAFFIC (1 TO 6 FEET HIGH)	PROVIDES COLOR	SPECIES IN HABIT
S	*Ilex vomitoria 'Nana'*	Dwarf yaupon	E	●			●		●		
G	*Juniperus horizontalis 'Wiltonii'*	Blue Rug Juniper	E				●		●	●	
U	*Juniperus virginiana*	Eastern Red Cedar	E	●	●	●	●	●			
G	*Liriope muscari*	Liriope/Lilyturf	E					●	●	●	
G	*Lonicera sempervirens*	Honeysuckle	D					●		●	
C	*Magnolia grandiflora*	Southern Magnolia	E		●		●			●	
U	*Magnolia soulangeana*	Saucer Magnolia	D		●		●	●	●	●	

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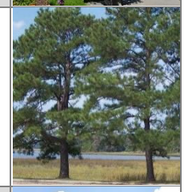
PLANT GROUP [1]	SCIENTIFIC NAME	COMMON NAME	LEAF TYPE [2]	FORMS AND LINKS SPACES (20 TO 60 FEET HIGH)	PROVIDES FOCAL INTEREST (15 TO 60 FEET HIGH)	PROVIDES SHADE (20 TO 60 FEET HIGH)	PROVIDES SAFETY BUFFER AND SCREENS VIEW [3]	DEFINES SPACE (6 TO 10 FEET HIGH)	CONTROLS TRAFFIC (1 TO 6 FEET HIGH)	PROVIDES COLOR	SPECIES IN HABIT
U	*Magnolia virginiana*	Sweet Bay Magnolia	D		●		●	●			
U	*Pinus taeda*	Loblolly Pine	E			●				●	
C	*Quercus alba*	White oak	D	●	●	●	●		●		
C	*Quercus falcata*	Southern Red Oak	D	●	●	●				●	
C	*Quercus michauxii*	Swamp Chestnut Oak	D	●	●	●				●	
C	*Quercus nigra*	Water Oak	D			●					
C	*Quercus nutallii*	Nuttall Oak	D	●	●		●				

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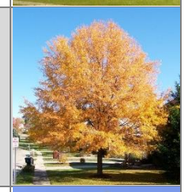
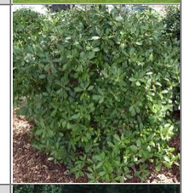
PLANT GROUP [1]	SCIENTIFIC NAME	COMMON NAME	LEAF TYPE [2]	FORMS AND LINKS SPACES (20 TO 60 FEET HIGH)	PROVIDES FOCAL INTEREST (15 TO 60 FEET HIGH)	PROVIDES SHADE (20 TO 60 FEET HIGH)	PROVIDES SAFETY BUFFER AND SCREENS VIEW [3]	DEFINES SPACE (6 TO 10 FEET HIGH)	CONTROLS TRAFFIC (1 TO 6 FEET HIGH)	PROVIDES COLOR	SPECIES IN HABIT
C	*Quercus palustris*	Pin Oak	D	●	●	●					
C	*Quercus phellos*	Willow Oak	D	●		●				●	
C	*Quercus shumardii*	Shumard Oak	D	●		●				●	
C	*Taxodium distichum*	Bald Cypress	E	●	●	●	●			●	
S	*Ternstroemia gymnanthera*	Cleyera	E					●		●	
G	*Trachelospermum asiaticum*	Asian Jasmine	E						●	●	
C	*X Cupressocyparis leylandii*	Leyland Cypress	E	●			●	●			

Source: PBA ADEP/IPS Workshop, January 2019.

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5 APPENDICES

5.1 APPENDIX A – GLOSSARY OF ACRONYMS

AASHO	American Association of State Highway Officials
ADA	Americans with Disabilities Act
ADP	Area Development Plan
ASTM	American Society of Testing and Materials
AT/FP	Anti-Terrorism/Force Protection
BES	Building Envelope Standards
BMP	Best Management Practice
CBRN	Chemical, Biological, Radiological and Nuclear
CDC	Child Development Center
CMU	Concrete Masonry Unit
DCIP	Defense Critical Infrastructure Program
DoD	Department of Defense
DOT	Department of Transportation
DPW	Directorate of Public Works
ESQD	Explosive Safety Quantity-Distance
FHA	Federal Highway Administration
GAB	Graded Aggregate Base
IPS	Installation Planning Standards
MEP	Military Equipment Parking
MM	Materiel Management
MWR	Morale, Welfare and Recreation
O.C.	On Center
OGA	Open Graded Aggregate
OSHA	Occupational Safety and Health Administration
PBA	Pine Bluff Arsenal
POV	Privately Owned Vehicle
PSI	Pounds per Square Inch
RBL	Required-Build-to-Line
ROW	Rights-of-Way
SES	Street Envelope Standards
UFAS	Uniform Federal Accessibility Standards
UFC	Unified Facilities Criteria
VOC	Volatile Organic Compound

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INSTALLATION PLANNING STANDARDS

PINE BLUFF ARSENAL

FINAL

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POND | KFS

APPENDIX F
USACE HPSB CHECKLISTS

Energy & Sustainability Record Card

PROJECT INFORMATION

Project No.: FY 27 MILCON Project No. / Other Customer Reference No.:
Project Title: Pine Bluff Arsenal (PBA) Access Control Point (ACP) Plainview Gate
Location: Litte Rock, Arkansas
USACE Project Manager: Justin Selby Project Design Level: 65%
Facility Area: 4,997 Units (SF/SM): SF Category Code: Facility #:

AE Firm Name: Kenall, Inc.
AE Contract # & T.O.: W9127S23D6035/W9127S24F6002 AE Sustainability POC: David Ayers

Construction Contractor: N/A Award Date:
Construction Contract & T.O.: N/A BOD Date:
Contractor Sustainability POC: N/A

SUSTAINABILITY DATA - GUIDING PRINCIPLES for SUSTAINABLE DEVELOPMENT

OVERALL COMPLIANCE:

- (●) **Complies with UFC 1-200-02 and Agency Sustainability Policy Building**
- ( ) **does not meet the criteria for tracking in UFC 1-200-02/Policy**
- ( ) **An Exemption has been: ◯ Requested ⬭ Granted ⬭ N/A**

BUILDING IDENTIFICATION:

1 How many buildings are included in this project? 2

2 Of those, which building is this form for? Visitor Control Center

3 New building or stand-alone addition greater than or equal to 10,000 GSF? Yes ☐ No ☑

- If project is for more than one building for which tracking is required, complete a separate form for each building.

- If an element was not achieved at project completion, mark "Not Attained" and include a justification in the "Not attained reason" field.

DOCUMENTATION OF COMPLIANCE WITH GUIDING PRINCIPLES

I. Employ Integrated Design Principles

1 Integrated Design

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to
☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

Not attained reason

2 Commissioning

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to
☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

Not attained reason

(i) Systems commissioned HVAC and Controls, Lighting Controls, Dom. Hot Water

II. Optimize Energy Performance

3. Energy Efficiency

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason

(i) Energy Savings Below Baseline % 35.7

(ii) Energy Standard

☐ ASHRAE 90.1-2013 (06NOV16+) ☐ IECC

☐ ASHRAE 90.1-2016 ☑ OTHER:

ASHRAE 90.1-2022

C. Energy Efficient Products

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason

4. Renewable Energy

Attained In Compliance ☐ Yes ☑ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☑ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason

A. Renewable energy technology types

☐ Geothermal ☐ Daylighting (quantified passive)

☐ Ground Source Heat Pumps ☐ Mechanical (i.e., direct water pumping)

☐ Solar Photovoltaic ☐ Micro-hydro

☐ Solar Thermal - domestic hot water ☐ Concentrating (sterling)

☐ Solar Thermal - space conditioning ☐ Wind

(i) Annual % of total load

(ii) System size (kwatts)

B. Solar Hot Water Percentage - 30% target

Attained In Compliance ☐ Yes ☑ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☑ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason

(i) Annual % of total load

(ii) System size (kBTU/Year)

5. Meter (Energy)

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason

6. Energy Use Intensity kBTU/Sq Ft/Year

(i) Total Design Energy Use Intensity (EUI): kBTU/Sq Ft/Year 40.0

III. Protect and Conserve Water

7. Indoor Water Use

A. Water-Efficient Products

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason

(i) Total Design Indoor Water Use Intensity (WUI): Gallons/Sq Ft/Year 67.8

B. Indoor Water Meter

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason

8. Outdoor Water Use

A. Outdoor Water Meter (for 25,000 SF of irrigation)

(i) Is there a permanent irrigation system serving more than 25,000 SF of landscaping?

☐ Yes ☑ No

(ii) Water Meter

Attained In Compliance ☐ Yes ☑ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☑ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason

B. Water-efficient landscape

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason

9. Alternative Water Use

Attained In Compliance ☐ Yes ☐ N/A ☑ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue
☑ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

Not attained reason: The limited demand of non-potable water and the low cost of water for the s

Methods Used:

☐ Air Handler Condensate Capture ☐ Reclaimed Water
☐ Grey Water ☐ Treated Wastewater
☐ Harvested Rainwater ☐ OTHER:

10. Stormwater Management - update the LID Data tab

IV. Enhance Indoor Environmental Quality

11. Ventilation and Thermal Comfort

A. Ventilation

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

Not attained reason:

B. Thermal Comfort

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

Not attained reason:

12. Daylighting and Lighting Controls

A. Daylight

Attained In Compliance ☐ Yes ☐ N/A ☑ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

Not attained reason: The area of the daylight is fractional for daylighting control.

B. Automatic dimming controls

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

Not attained reason:

13. Indoor Air Quality

A. Moisture Control

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason

B. Low-Emitting Materials

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason

C. Indoor Air Quality during Construction

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason

14. Occupant Health and Wellness

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason

V. Reduce the Environmental Impact of Materials

15. Material Content and Performance

A. Resource Conservation and Recovery Act (RCRA) Section 6002 (recycled content)

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason

B. Farm Security and Rural Investment Act (FSRIA) section 9002 (Biobased content)

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason

16. Waste Management

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason

17. Waste Diversion - 60% target

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason

(i) Percent diverted _____

VI. Assess and Consider Climate Change Risks

18. Address Climate Change Risk

Attained In Compliance ☐ Yes ☐ N/A ☑ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason: No known risk associated with the site.

THIRD PARTY CERTIFICATION INFORMATION

Is this building pursuing Third Party Certification? ☐ Yes ☑ No

Reason not included: Less than 10,000 SF

Sustainability Third Party Certification Rating

Third Party Certification Rating System and Level

☐ USGBC LEED Certified

☐ USGBC LEED Silver

☐ USGBC LEED Gold

☐ USGBC LEED Platinum

☐ USGBC "Guiding Principles Assessment"

☐ OTHER:

☐ GBI Green Globes 1 Globe

☐ GBI Green Globes 2 Globes

☐ GBI Green Globes 3 Globes

☐ GBI Green Globes 4 Globes

☐ GBI "Guiding Principles Compliance"

Energy & Sustainability Record Card

PROJECT INFORMATION

Project No.: FY 27 MILCON Project No. / Other Customer Reference No.:
Project Title: Pine Bluff Arsenal (PBA) Access Control Point (ACP) Plainview Gate
Location: Litte Rock, Arkansas
USACE Project Manager: Justin Selby Project Design Level: 65%
Facility Area: 993 Units (SF/SM): SF Category Code: Facility #:

AE Firm Name: Kenall, Inc.
AE Contract # & T.O.: W9127S23D6035/W9127S24F6002 AE Sustainability POC: David Ayers

Construction Contractor: N/A Award Date:
Construction Contract & T.O.: N/A BOD Date:
Contractor Sustainability POC: N/A

SUSTAINABILITY DATA - GUIDING PRINCIPLES for SUSTAINABLE DEVELOPMENT

OVERALL COMPLIANCE:

- (●) **Complies with UFC 1-200-02 and Agency Sustainability Policy Building**
- ( ) **does not meet the criteria for tracking in UFC 1-200-02/Policy**
- ( ) **An Exemption has been: ◯ Requested ⬭ Granted ⬭ N/A**

BUILDING IDENTIFICATION:

1 How many buildings are included in this project? 2

2 Of those, which building is this form for? Gate House

3 New building or stand-alone addition greater than or equal to 10,000 GSF? Yes ☐ No ☑

- If project is for more than one building for which tracking is required, complete a separate form for each building.

- If an element was not achieved at project completion, mark "Not Attained" and include a justification in the "Not attained reason" field.

DOCUMENTATION OF COMPLIANCE WITH GUIDING PRINCIPLES

I. Employ Integrated Design Principles

1 Integrated Design

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to
- ☐ Mission preclusion
- ☐ Not LCCE
- ☐ Installation/region issue
- ☐ Building/site issue
- ☐ Renovation only: not part of scope

Not attained reason

2 Commissioning

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to
- ☐ Mission preclusion
- ☐ Not LCCE
- ☐ Installation/region issue
- ☐ Building/site issue
- ☐ Renovation only: not part of scope

Not attained reason

(i) Systems commissioned HVAC and Controls, Dom. Hot Water

II. Optimize Energy Performance

3. Energy Efficiency

Attained In Compliance ☐ Yes ☐ N/A ☑ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason: HIghest energy reduction obtained at current level of design.

(i) Energy Savings Below Baseline % 16.0

(ii) Energy Standard

☐ ASHRAE 90.1-2013 (06NOV16+) ☐ IECC

☐ ASHRAE 90.1-2016 ☑ OTHER:

ASHRAE 90.1-2022

C. Energy Efficient Products

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason:

4. Renewable Energy

Attained In Compliance ☐ Yes ☑ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☑ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason:

A. Renewable energy technology types

☐ Geothermal ☐ Daylighting (quantified passive)

☐ Ground Source Heat Pumps ☐ Mechanical (i.e., direct water pumping)

☐ Solar Photovoltaic ☐ Micro-hydro

☐ Solar Thermal - domestic hot water ☐ Concentrating (sterling)

☐ Solar Thermal - space conditioning ☐ Wind

(i) Annual % of total load

(ii) System size (kwatts)

B. Solar Hot Water Percentage - 30% target

Attained In Compliance ☐ Yes ☑ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☑ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason:

(i) Annual % of total load _____

(ii) System size (kBTU/Year) _____

5. Meter (Energy)

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason

6. Energy Use Intensity kBTU/Sq Ft/Year

(i) Total Design Energy Use Intensity (EUI): kBTU/Sq Ft/Year 107.9

III. Protect and Conserve Water

7. Indoor Water Use

A. Water-Efficient Products

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason

(i) Total Design Indoor Water Use Intensity (WUI): Gallons/Sq Ft/Year 2.7

B. Indoor Water Meter

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason

8. Outdoor Water Use

A. Outdoor Water Meter (for 25,000 SF of irrigation)

(i) Is there a permanent irrigation system serving more than 25,000 SF of landscaping?

☐ Yes ☑ No

(ii) Water Meter

Attained In Compliance ☐ Yes ☑ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☑ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason

B. Water-efficient landscape

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason

9. Alternative Water Use

Attained In Compliance ☐ Yes ☐ N/A ☑ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue
☑ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

Not attained reason: The limited demand of non-potable water and the low cost of water for the s

Methods Used:

☐ Air Handler Condensate Capture ☐ Reclaimed Water
☐ Grey Water ☐ Treated Wastewater
☐ Harvested Rainwater ☐ OTHER:

10. Stormwater Management - update the LID Data tab

IV. Enhance Indoor Environmental Quality

11. Ventilation and Thermal Comfort

A. Ventilation

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

Not attained reason:

B. Thermal Comfort

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

Not attained reason:

12. Daylighting and Lighting Controls

A. Daylight

Attained In Compliance ☐ Yes ☐ N/A ☑ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

Not attained reason: The area of the daylight is fractional for daylighting control.

B. Automatic dimming controls

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

Not attained reason:

13. Indoor Air Quality

A. Moisture Control

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason

B. Low-Emitting Materials

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason

C. Indoor Air Quality during Construction

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason

14. Occupant Health and Wellness

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason

V. Reduce the Environmental Impact of Materials

15. Material Content and Performance

A. Resource Conservation and Recovery Act (RCRA) Section 6002 (recycled content)

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason

B. Farm Security and Rural Investment Act (FSRIA) section 9002 (Biobased content)

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason

16. Waste Management

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason

17. Waste Diversion - 60% target

Attained In Compliance ☑ Yes ☐ N/A ☐ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason

(i) Percent diverted _____

VI. Assess and Consider Climate Change Risks

18. Address Climate Change Risk

Attained In Compliance ☐ Yes ☐ N/A ☑ Not Attained

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Not attained reason: No known risk associated with the site.

THIRD PARTY CERTIFICATION INFORMATION

Is this building pursuing Third Party Certification? ☐ Yes ☑ No

Reason not included: Less than 10,000 SF

Sustainability Third Party Certification Rating

Third Party Certification Rating System and Level

☐ USGBC LEED Certified

☐ USGBC LEED Silver

☐ USGBC LEED Gold

☐ USGBC LEED Platinum

☐ USGBC "Guiding Principles Assessment"

☐ OTHER:

☐ GBI Green Globes 1 Globe

☐ GBI Green Globes 2 Globes

☐ GBI Green Globes 3 Globes

☐ GBI Green Globes 4 Globes

☐ GBI "Guiding Principles Compliance"

APPENDIX G
DRAFT 34 75 13.13 CRASH RATED ACTIVE VEHICLE BARRIERS AND CONTROLS

SECTION 34 75 13.13

CRASH RATED ACTIVE VEHICLE BARRIERS AND CONTROLS
02/22

PART 1 GENERAL

This UFGS replaces UFGS 34 75 13.19. All references in other documents, standards, and criteria to 34 75 13.19 now apply to 34 75 13.13.

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO GDHS-7	(2018; Errata 2019) A Policy on Geometric Design of Highways and Streets
AASHTO LTS	(2013; Errata 2013) Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals
AASHTO RSDG-4	(2011; Errata 1 2012; Errata 2 2015) Roadside Design Guide

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M	(2025) Structural Welding Code - Steel

ASTM INTERNATIONAL (ASTM)

ASTM A106/A106M	(2019a) Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service
ASTM A123/A123M	(2024) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM D4956	(2013) Standard Specification for Retroreflective Sheeting for Traffic Control
ASTM F2656/F2656M	(2023) Standard Test Method for Crash Testing of Vehicle Security Barriers

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 142	(2007; Errata 2014) Recommended Practice for Grounding of Industrial and Commercial Power Systems - IEEE Green Book

IEEE C37.90	(2005; R 2011) Standard for Relays and Relay Systems Associated With Electric Power Apparatus
IEEE C37.90.1	(2023; ERTA) Standard for Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus
IEEE C62.41.1	(2002; R 2008) Guide on the Surges Environment in Low-Voltage (1000 V and Less) AC Power Circuits
IEEE C62.41.2	(2002) Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and Less) AC Power Circuits

INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC)

IEC 60068-2-27	(2008; ED 4.0) Environmental Testing - Part 2-27: Tests - Test Ea and Guidance: Shock
IEC 60068-2-30	(2025; ED 4.0) Environmental Testing - Part 2-30: Tests - Test Db: Damp Heat, Cyclic (12 H + 12 H Cycle)
IEC 61000-4-5	(2017) Electromagnetic Compatibility (EMC) - Part 4-5: Testing and Measurement Techniques - Surge Immunity Test
IEC 61131-3	(2025) Programmable Controllers - Part 3: Programming Languages

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO ISO/IEC 17025	(2017) General Requirements for the Competence of Testing and Calibration Laboratories

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA 250	(2020) Enclosures for Electrical Equipment (1000 Volts Maximum)
NEMA ICS 1	(2022) Standard for Industrial Control and Systems: General Requirements
NEMA ICS 2	(2000; R 2020) Industrial Control and Systems Controllers, Contactors, and Overload Relays Rated 600 V
NEMA ICS 4	(2015) Application Guideline for Terminal Blocks
NEMA MG 00001	(2024) Motors and Generators

NEMA TC 2	(2020) Standard for Electrical Polyvinyl Chloride (PVC) Conduit
NEMA TS-1	(1989; R 2020) Traffic Control Systems (not recommended for new designs)
NEMA TS-2	(2021) Traffic Controller Assemblies with NTCIP Requirements - Version 03.08

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2026) National Electrical Code
NFPA 70E	(2024) Standard for Electrical Safety in the Workplace

SOCIETY OF AUTOMOTIVE ENGINEERS INTERNATIONAL (SAE)

SAE J517	(2020) Hydraulic Hose

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2024) Safety -- Safety and Occupational Health (SOH) Requirements

U.S. DEPARTMENT OF DEFENSE (DOD)

DOD 8500.01	(2014; Change 1-2019) Cybersecurity
DOD 8510.01	(2022) Risk Management Framework (RMF) for DoD Systems

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)

MUTCD	(2023) Manual on Uniform Traffic Control Devices
NCHRP 350	(1993) Recommended Procedures for the Safety Performance Evaluation of Highway Features

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

21 CFR 1040	Performance Standards for Light-Emitting Products
29 CFR 1910	Occupational Safety and Health Standards
47 CFR 15	Radio Frequency Devices

UL SOLUTIONS (UL)

UL 486A-486B	(2025) UL Standard for Safety Wire Connectors
UL 508	(2018; Reprint Jul 2021) UL Standard for

	Safety Industrial Control Equipment
UL 651	(2011; Reprint May 2022) UL Standard for Safety Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
UL 796	(2020; Reprint Oct 2023) UL Standard for Safety Printed Wiring Boards
UL 1059	(2024) UL Standard for Safety Terminal Blocks
UL 1076	(2018; Reprint Feb 2021) UL Standard for Safety Proprietary Burglar Alarm Units and Systems

1.2 ABBREVIATIONS AND DEFINITIONS

1.2.1 Abbreviations

a. ACP - Access Control Point
b. AIE - Automated Installation Entry
c. AVB - Active Vehicle Barrier
d. AVBCS - Active Vehicle Barrier Control System
e. BMS - Balanced Magnetic Switch
f. CCTV - Closed Circuit Television System
g. CPU - Central Processing Unit (Computer)
h. CSMS - Central Security Monitoring Station (e.g., Installation Police Station)
i. CVT - Contractor Verification Test
j. DTS - Data Transmission System
k. ECF - Entry Control Facility
l. EFO - Emergency Fast Operate (active barrier emergency fast close control)
m. FAT - Factory Acceptance Test
n. IDS - Intrusion Detection System
o. PLC - Programmable Logic Controller
p. PVT - Performance Verification Test
q. RSM - Remote Status Monitor
r. SDC - Standard Design/Criteria
s. SDDC - Surface Deployment and Distribution Command
t. SDDCTEA - Surface Deployment and Distribution Command Traffic Engineering Agency
u. TCU - Traffic Controller Unit
v. UPS - Uninterruptible Power Supply
w. VCC - Visitors Control Center
x. VPD - Vehicle Presence Detector

1.2.2 Definitions

Command & Control. Command & Control function refers to location the main guard will be located to oversee the activity at the ECF/ACP. This is typically the Gatehouse, but not in all cases.

Crash-rated active vehicle barrier. Crash-rated active vehicle barrier and active vehicle barrier in this specification refer to a vehicle barrier that has been tested to impede or stop a vehicle of a specific weight and speed. The barrier is operable either manually or through

electrical controls.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" classification. Submittals not having a "G" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Overall System Drawings; G, AE

Point to Point Wiring Information; G, AE

TRAFFIC CONTROL PLANS; G, AE

crash rated active vehicle barrier system; G,AE

Installation; G, AE

Electrical Work; G,AE

Touchscreen; G

SD-03 Product Data

Major Components; G,AE

Data Package; G,AE

CRASH RESISTANCE: DEMONSTRATION OF COMPLIANCE; G,AE

Hydraulic Fluid manufacturer's data; G

SD-05 Design Data

traffic signal support design calculations; G

UPS Calculations; G

Generic Design and Contract Revisions; G

SD-06 Test Reports

Crash Test Reports; G

Current Site Conditions; G

KEY CONTROL PLAN; G

Factory Acceptance Test; G

Factory Acceptance Test Report; G

Contractor Verification Test; G

Contractor Verification Test Report; G

Performance Verification Test (PVT); G

Performance Verification Test Report; G

Endurance Test; G

Final Report; G

SD-07 Certificates

COMPONENT CERTIFICATION; G

Cybersecurity Equipment Certification; G

Cybersecurity Installation Certification; G

Installation Superintendent Qualifications; G,

Project Manager Qualifications; G

TECHNICAL SPECIALISTS QUALIFICATIONS; G

SD-08 Manufacturer's Instructions

Manufacturer Repair of Coatings Instructions; G

SD-10 Operation and Maintenance Data

Operation and Maintenance Manuals; G

OPERATING AND MAINTENANCE INSTRUCTIONS; G

Submit operation and maintenance data in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA, Controls O&M Data Package and the requirements herein.

1.4 INSTALLATION PACKAGE

Submit Installation package 120 days after receipt of the Notice to Proceed. The installation package consists of the overall system drawings, major components and data package.

1.4.1 Overall System Drawings

Include the following in overall system drawing package:

a. Functional System Block Diagram, identifying all major equipment including interconnection between components specified herein and those furnished under other sections and communications protocols.

(1) Indicate control/signal and data communication paths and identify PLCs, control interface devices, and media to be used

(2) Describe characteristics of network and other data communication lines.

(3) Describe methods used to protect against power outages and transient voltages including types and ratings of isolation and surge suppression devices used in data, communication, signal, control, and ac and dc power circuits.

b. Block and Wiring Diagrams of each subsystem.

c. Drawing showing equipment layout in the Command & Control including the Master control panel, UPS, and other hardware intended to be located in the Command & Control.

d. Drawing showing equipment layout around the crash rated active vehicle barriers including the crash rated active vehicle barriers, active vehicle barrier control box(es), vehicle presence detectors, stop lines, traffic signals, warning beacons (wig-wag warning signals) (if applicable), and actuated traffic arms (if applicable).

e. A signing and pavement marking plan.

f. Drawing showing layout and dimensions of the each individual active vehicle barrier operating panels.

g. Touchscreen Audible Tones and Visual Indications if used. Include the following material for use at touchscreen video control panels:

(1) Audible indication, notification, and alarm tones.

(2) Visual materials for touchscreen video control panel display screens, complete with proposed shapes, colors, scale, and textual content. Provide the following: graphics, including maps; icons; dialog boxes; and help messages, prompts and instructions. Provide material in color.

h. Tamper switch locations for AVBCS related cabinets and operating panels.

i. Vehicle presenceand wrong-way detector locations, set-points, and sensor detection patterns. Include descriptions of the security strategy for detecting potential threat vehicles, the coverage and operation of the sensors, and the human machine interfaces for overspeed and wrong way alarms.

j. Details of connections to power sources, including power supplies and grounding.

k. Preliminary point-to-point wiring database. Preliminary submittals is to provide sufficient detail to ensure the final database has all the appropriate information. Provide details such as the legend to be used for the different wiring types, alphanumeric numbering scheme, abbreviations to be used, and the layout of the database. Provide an example of a small section of the system showing the point-to-point wiring.

1.4.2 Point to Point Wiring Information

Final point-to-point wiring diagram of complete interconnected system including database listing of wire numbers, to and from designations, and wire characteristics. Provide the final database for the wiring. The database is to include details such as the legend to be used for the different wiring types, alphanumeric numbering scheme, abbreviations to be used, and where the wire starts and where it ends..

1.4.3 Major Components

Submit the following for approval:

a. Active Vehicle Barrier Controls to include pushbuttons, indicating lights, switches and panels.

b. Programmable Logic Controller.

c. Traffic Signs: powered and unpowered.

d. Traffic signals and traffic signal supports.

e. Warning Beacons (wig-wags).

f. In-pavement lights (if required).

g. Alarm display panels.

h. Sequence of Events Recorder.

i. Cable and wiring used for the data transmission.

j. Surge protection device.

k. Cabinets and other main components needed to make a complete system.

l. Tamper switches.

m. Actuated traffic arms.

n. Touch screens.

o. Equipment used for presence detection.

p. Wrong-way detection.

1.4.4 Data Package

1.4.4.1 Delivery

Deliver all items of computer software and technical data (including technical data which relates to computer software), which is specifically identified in this specification in accordance with the CONTRACT CLAUSES, SPECIAL CONTRACT REQUIREMENTS, and in accordance with the Contract Data Requirements List (CDRL), DD FORM 1423, which is attached to and thereby made a part of this contract. Identify all data delivered by reference to

the particular specification paragraph against which it is furnished.

1.4.4.2 Technical Data and Software

Include the following in the data package:

a. Communications speeds and protocol descriptions.

b. Operator commands.

c. Alarm and system messages and printing formats.

d. Start-up and shut-down operations including system and database backup operations.

e. Expansion capability and method of implementation.

f. Sample copy of sequence of events report.

g. Color print of the graphical user interface (GUI) screens (when used) on 8-1/2 by 11 inch paper.

h. System data entry requirements.

i. User enrollment.

j. System and application software descriptions.

k. Recovery and restart procedures.

l. Use of report generator and generation of reports.

1.4.4.3 Active Vehicle Barrier Controls

Describe operation of the different barrier control operating modes to include normal and emergency operation, barrier control switches, actuated traffic arms,wrong-way, traffic signals, warning beacons, and vehicle presence detectors. Include description of security strategy for defeating a threat vehicle and the SDDC approved barrier safety scheme for protecting innocent vehicles from barrier operations.

1.5 TRAFFIC CONTROL PLANS

1.5.1 Traffic Control Plan for the maintenance of traffic during construction

Provide a Traffic Control Plan for maintenance of traffic during construction per Section 08C of EM 385-1-1.

1.5.2 Traffic Control Plan During Crash Rated Active Vehicle Barrier Maintenance

Describe plans for taking one or more active barriers out of service for maintenance or testing purposes, while other barriers at the ACP/ECF remain in service. As a minimum, include requirements for traffic signal indications, for bagging signal heads, and for temporary passive barriers and signage, e.g., Type 3 passive barriers, per MUTCD. Include both short

term (less than an hour) and long term plans.

1.6 COMPONENT CERTIFICATION

Provide certifications from the manufacturers of the following equipment as part of the data package: crash rated active vehicle Barrier, programmable logic controller (PLC),traffic arm, warning signal, annunciator, sequence of events recorder, and all sensors including wrong-way, and vehicle presence.

1.7 CYBERSECURITY EQUIPMENT CERTIFICATION

Furnish a certification that control systems are designed and tested in accordance with Section 25 05 11 CYBERSECURITY OF FACILITY RELATED CONTROL SYSTEMS, and as required by individual Service Implementation Policy.

1.8 OPERATION AND MAINTENANCE MANUALS

Submit finalized manuals in electronic/digitial format within 30 days after completing the Endurance test. Update the draft copy used during site testing with any changes required prior to final delivery of the manuals. Identify each manual's contents on the cover. Include in each manual the names, addresses, and telephone numbers of each subcontractor installing equipment and systems, and the nearest service representative for each item of equipment. Provide each manual with a table of contents and tab sheets. Place tab sheets at the beginning of each chapter or section and at the beginning of each appendix. Include modifications made during installation, checkout, and acceptance in the final copies delivered after completion of the endurance test. Provide the number of copies of each manual to be delivered per DD FORM 1423.

1.8.1 Software Manual

In the software manual describe the functions of all software and include all other information necessary to enable proper loading, testing, and operation. As a minimum, include in the manual the following:

a. Definition of terms and functions.

b. Use of system and application software.

c. Procedures for system initialization, start-up and shutdown.

d. Alarm reports.

e. Reports generation.

f. Database format and date entry requirements.

g. Directory of all disk files.

h. Description of all communication protocols, including data formats, command characters, and a sample of each type of data transfer.

1.8.2 Hardware Manual

As a minimum, describe all equipment furnished in the hardware manual and

include the following:

a. General description and specifications.

b. Installation and checkout procedures.

c. Equipment electrical schematics and layout drawings.

d. System schematics and layout drawings.

e. Alignment and calibration procedures.

f. Manufacturer's repair parts list indicating sources of supply.

1.8.3 Functional Design Manual

Identify the operational requirements for the system and explain the theory of operation, design philosophy, and specific functions within the functional design manual. Include a description of hardware and software functions, interfaces, and requirements for all system operating modes.

1.8.4 Maintenance Manual

Include descriptions of maintenance for all equipment including inspection, periodic prevention maintenance (include specific time intervals for each recommended preventative maintenance tasks), fault diagnosis, and repair or replacement of defective components in the maintenance manual.

1.8.5 Application Software

Provide a copy of the software installation package on optical disk that runs the control program. Provide on optical disk, separate from the operating system software, the complete program or image of the installed software, with all custom changes and configuration data specific for the installed system. At the end of project, after the endurance test is complete, provide complete sets of optical discs. Provide one set of discs to the USACE Protective Design Center.Provide one to be turned over to the User.

1.8.6 Final System Drawings

Maintain a separate set of drawings (including site, civil, electrical, mechanical, structural, and architectural plans, elevations, and details), elementary diagrams, wiring diagrams, and control diagrams of the system to be used for final system drawings. This set is to be accurately kept up-to-date with all changes and additions to the AVBCS and to be delivered to the Government with the final endurance test report. In addition to being complete and accurate, this set of drawings is to be kept neat and not be used for installation purposes. Furnish final drawings with the endurance test report on optical disk in AutoCAD latest version format.

1.9 CRASH RESISTANCE: DEMONSTRATION OF COMPLIANCE

Submit the following as demonstration of compliance with the specified crash resistance requirements for each crash rated active vehicle barrier proposed for this project. Department of Defense requires all crash-rated active vehicle barriers to be on the DOD Anti-Ram Vehicle List. The DOD

Anti-Ram Vehicle List in effect at the time of contract award is to be used.

1.9.1 DOD Letter of Certification

Submit a DOD Letter of Certification for crash-rated active vehicle barrier with a configuration identical to the as tested crash rated active vehicle barrier being provided. DOS Letter of Certification is allowed; however, the crash-rated active vehicle barrier must be on the DOD anti-ram vehicle barrier list.

1.9.2 Crash Test Report

Submit a crash test report for crash-rated active vehicle barrier with a configuration identical to the as tested crash rated active vehicle barrier being provided from a testing laboratory accredited by a nationally recognized testing agency in accordance with ISO ISO/IEC 17025. This report is only required for crash-rated active vehicle barriers that are not on the DOD list. The information is to be submitted with the barrier submittal and is to show an approved crash test per ASTM F2656/F2656M. This submittal takes up to 8 weeks to review and is not quarantee that the report will be approved.

1.9.3 Different Length

The only exception to the requirement that the tested crash rated active vehicle barrier be identical to the as tested crash rated active vehicle barrier being provided is the barrier's length. If a length other than that tested is required, the length of the required crash rated active vehicle barrier must represent an interperloation between the successfully tested lengths of crash rated active vehicle barriers that are identical in all other ways. The tested shorter crash rated active vehicle barrier and the tested longer crash rated active vehicle barrier must be identical in construction and testing conditions before the alternate length can be considered. If the length of the required barrier for this project is different than the length tested, provide Crash Test Reports for identical barriers at the maximum/minimum width conditions as required by ASTM F2656/F2656M section 8.2.5. In addition to the test report, provide a letter written by the manufacturer clearly stating that the alternate length crash rated active vehicle barrier is to be constructed in the same manner as the tested barriers. The crash test reports are to be submitted to the Protective Design Center, Omaha US Army Corps of Engineers for review.

1.9.4 Engineering Analysis

Engineering analysis is not an acceptable form of Demonstration of Compliance.

1.9.5 Retrofitted Barrier Systems

Manufacturer is to provide additional documentation that indicates DOD, DOS or ASTM required ratings have been maintained for any barriers that were originally configured and tested with hydraulic systems, but have been revised or retrofitted to be electric (electromechanical). Provide sufficient information to compare the hydraulic system with the electric system to ensure the change in actuation does not change the ability of the barrier to maintain its tested rating. Manufacturer is to provide a response on company letter head stating that the rating is still valid

along with the supporting material.

Provide documentation from the manufacturer that ensures the motor and actuator is sized sufficiently for long term use given the weight of the barrier and the response time requirements. In addition, ensure the electrical components are adequate for the environment as covered elsewhere in this specification.

1.10 QUALITY CONTROL

1.10.1 Project Manager Qualifications

Designate a Project Manager for all work under this specification. Project Manager is to provide technical and managerial leadership to all contractor personnel and subcontractors during the design, manufacturer, and installation phases of this specification. This person serves as the single point of contact for the General Contractor for all work required in this specification. The Project Manager must have a minimum of 5 years of experience in the design, manufacture, and installation of similar systems.

1.10.2 Installation Superintendent Qualifications

Designate an Installation Superintendent responsible for onsite installation team direction and leadership. First line supervision of tradesmen and subcontractors is provided by the Superintendent. The Superintendent is responsible for job planning and coordination between the work with trades, subcontractors, vendors, and site personnel. The Superintendent is responsible for scheduling materials, equipment, and labor to maintain the flow of work commensurate with the task schedule. The Superintendent administers and executes the provisions of the Accident Prevention Plan. The Superintendent must have a minimum of 5 years of experience in the installation, operation, and testing of similar systems. The Project Manager and the Installation Superintendent can be the same individual.

1.11 TECHNICAL SPECIALISTS QUALIFICATIONS

Provide the services of technical specialists for the crash rated active vehicle Barriers and the related control system. Submit names and qualifications for each of the technical specialists involved. The technical specialists are to have a minimum of 3 years of experience in the installation, operation, and testing of all components, software, and interconnecting wiring of their particular equipment/subsystem. The presence of each technical specialist is required during Factory Tests of the system, during installation in the field, and serves as the Contractor's Commissioning Specialist for their designated equipment/subsystem for the commissioning tests as specified.

1.12 KEY CONTROL PLAN

Key control plan for all Contractor provided enclosures requiring locks and all keyed control switches. Provide a key control plan that includes the following: 1) Procedures that will be used to log and positively control all keys during installation. 2) A listing of all keys and where they are used. 3) A listing of all persons allowed access to the keys.

1.13 DELIVERY, STORAGE, AND HANDLING

Protect components delivered to site and/or placed in storage from the weather, humidity (and humidity variation), temperature (and temperature variation), dirt and dust, or other contaminants. Store structural materials on sleepers or pallets and protect them from rust and objectionable materials such as dirt, grease, or oil. Handle all components to protect finish and coatings from scuffs, abrasions or other damage. Excessive damage to factory applied finishes and coatings is cause for rejection. Provide all other delivery, storage and handling protections as recommended by the manufacturer.

1.14 PROJECT/SITE CONDITIONS

1.14.1 Environmental Conditions

All materials, equipment and installation techniques must be appropriate for the prevalent environmental conditions at the installation location. Installation is to be in conformance with manufacturer's written environmental requirements. Submit Manufacturer's Environmental Requirements.

1.14.2 Exterior Conditions

House all components mounted in locations exposed to weather in corrosion-resistant enclosures with appropriate environmental protection. Improper housing design is not to cause a degradation in component performance.

Provide components (those installed outside or in an enclosure exposed outside) that meet the following ambient conditions:

a. Temperature: -25 to 140degrees F;

b. Pressure: Sea level to 15,000 feet above sea level;

c. Solar radiation: Six hours of solar radiation at dry bulb temperature of 120 degrees F including 4 hours of solar radiation at 104 watts psf;

d. Sand and dust: Wind driven for up to 6 mph;

e. Rain: 2 inches per hour and 5 inches per hour cyclic with wind plus one period of 12 inches per hour;

f. Humidity: 5 to 95 percent;

g. Fungus: Warm, humid atmosphere conducive to the growth of heterotrophic plants;

h. Salt fog: Salt atmosphere with 5 percent salinity;

i. Snow: Snow loading of 48 pounds psf per hour; blowing snow of 4.6 psf per hour;

j. Ice accretion: Up to 1/2 inch of radial ice;

k. Wind: Up to 50 mph with gusts to 66 mph, except that fence sensors are to detect intrusions up to 35 mph; and

l. Acoustical noise: Components are to suitable for use in high noise areas above 110 dB, such as flight lines, run up pads, and generator sites without adversely affecting their performance.

m. Elevation. 245 feet (approximate)

1.14.3 Interior Conditions

Provide equipment, which is installed in environmentally protected interior areas, that meet the performance requirements specified for the following ambient conditions:

a. Temperature: 32 to 120 degrees F. Components installed in unheated security protected areas must meet performance requirements for temperatures as low as zero degrees F;

b. Pressure: Sea level to 15,000 feet above sea level;

c. Relative humidity: 5 to 95 percent;

d. Fungus: Provide system components located in fungus growth inductive environments with a treatment to provide fungus resistance. Treatments cannot include mercury, materials increase the flammability of the material or surface being treated or cause skin irritation or other injury to personnel handling it during fabrication, transportation, operation, or maintenance of the equipment, or during use of the finished items when used for the purpose intended; and

e. Acoustical noise: Provide components suitable for use in high noise areas above 100 dB, such as boiler rooms, power plants, and foundries without adversely affecting their performance.

1.14.4 Traffic Flow

Typical vehicle speed over the barrier is expected to be 25 mph.

1.14.5 Site Power Supply

Power supply at the site is 230V 3 phase and is located as shown on the drawings.

1.14.6 Current Site Conditions

Prepare and submit a report on "Current Site Conditions", within 75 days of Notice to Proceed, to the Government documenting site conditions that significantly differ from the design drawings and include any conditions on the design documents that would negatively affect performance of the system to be installed. Provide specification sheets, or written functional requirements to support the findings, and a cost estimate to correct those site changes or conditions. Do not perform any field work until the "Current Site Conditions" report is approved by the Government. Do not correct any deficiencies identified in the report without written permission from the Contracting Officer. Review of this package is to be by the designer of record and the local government construction manager.

1.14.7 Generic Design and Contract Revisions

Contract drawings show generic power circuits and voltage configurations for the crash rated active vehicle barriers, sump pumps, heaters, roadway heat tape, and associated. Contractor is responsible for revising the circuit breakers (size and configuration), backup power supplies, conductors and conduit for the specific crash rated active vehicle barrier system the contractor has chosen. Any changes required are the responsibility of the contractor at no cost to the government. Changes required need to be submitted under the paragraph CONTRACT MODIFICATIONS.

1.15 MAINTENANCE AND SERVICE

1.15.1 Description of Work

The adjustment and repair of the system includes all vehicle barriers and systems installed under this specification. Provide and perform all repair, calibration, and other work in accordance with the manufacturer's documentation and instruction. Responsibility is limited to Contractor installed equipment.

1.15.2 Service Personnel

Certify service personnel in the maintenance and repair of the specific type of equipment installed and qualified to accomplish work promptly and satisfactorily. Advice the Government in writing of the name of the designated service representative, and of any change in personnel.

1.15.3 Schedule of Work

Perform two minor inspections at 6 month intervals (or more often if required by the manufacturer), and two major inspections offset equally between the minor inspections to effect quarterly inspection of alternating magnitude.

1.15.3.1 Minor Inspections

Include visual checks and operational tests of crash rated active vehicle barriers (cleaning pit if necessary), actuated traffic arms, traffic signals, console equipment, peripheral equipment, local processors, sensors, and electrical and mechanical controls as part of the minor inspections.

1.15.3.2 Major Inspections

Major inspections includes work described under paragraph Minor Inspections and the following work:

a. Clean interior and exterior surfaces of all system equipment and local processors, including monitors, keyboards, and console equipment.

b. Perform diagnostics on all equipment.

c. Check, walk test, and calibrate each sensor.

d. Run all system software diagnostics and correct all diagnosed problems.

e. Resolve any previous outstanding problems.

f. Purge and compress data bases.

g. Review network configuration.

1.15.3.3 Scheduled Work

Perform scheduled work during regular working hours, Monday through Friday, excluding federal holidays.

1.15.4 Operation

The applicable portion or portions from the performance verification test procedures are to be used after all scheduled maintenance and repair activities to verify proper component and system operation.

1.15.5 Records and Logs

Maintain records and logs of each performed task and organize cumulative records for each component and for the complete system chronologically resulting in a continuous log to be maintained for all devices. Provide a log that contains all initial settings. Ensure logs are kept and available for inspection onsite, demonstrating that planned and systematic adjustments and repairs have been accomplished for the system.

1.15.6 System Modifications

Make any recommendations for system modification in writing to the Government. Prior approval of the Government is required before any system modifications are made. Updating of the operation and maintenance manuals as well as any other documentation affected is required after any modification is made to the system.

1.15.7 Software

Provide a description of all software updates to the Government, who will then decide whether or not they are appropriate for implementation. After notification by the Government, implement the designated software updates and verify operation in the system. Accomplish updates in a timely manner, fully coordinated with system operators, and ensure all data is incorporated into the operation and maintenance manuals, and software documentation. Make a system image file prior to implementing any software update so the system can be restored to its original state if the update adversely affects system performance.

1.16 WARRANTY

Provide all labor, equipment, and materials required to maintain the entire system in an operational state as specified, for a period of one year after formal written acceptance of the system to include scheduled and nonscheduled adjustments. Contractor is responsible for ensuring the barriers are properly exercised and maintained per the manufacturer instructions until accepted by the Contracting Officer. If any corrections during the warranty period require a change to the program operating the AVB controls, then the contractor is responsible for ensuring a full commissioning effort is accomplished per the requirements herein. This programming change would be considered a latent defect, if the full commissioning failed to develop the issue.

1.16.1 Warranty Service

The Government initiates service calls to the Contractor when the system is not functioning properly. Qualified personnel must be available to provide service to the complete system. Furnish the Government with a telephone number where the service supervisor can be reached at all times. Warranty service is to comply with 01 78 00 CLOSEOUT SUBMITTALS and the with the following codes:

a. First Priority Code 1. Perform onsite inspection to evaluate situation, and determine course of action within 6 hours, initiate work within 12 hours and work continuously to completion or relief.

b. Second Priority Code 2. Perform onsite inspection to evaluate situation, and determine course of action within 2 days, initiate work within 24 hours and work continuously to completion or relief.

c. Third Priority Code 3. All other work to be initiated within 4 work days and work continuously to completion or relief.

d. The "Construction Warranty Service Priority List" is as follows:

Code 1-crash rated active vehicle barrier system (controls and barrier)
(1) Mechanical or electrical equipment failure that prevents the crash rated active vehicle barrier from opening or closing through the controls.
(2) Active vehicle barrier control system is unable to reset.
(3) Active vehicle barrier control system is unable to operate the crash rated active vehicle barriers properly.

Code 2-Active vehicle barrier system (controls and barrier)
(4) A single traffic signal is not operational.
(5) Problem associated with the vehicle presence detection system (typically safety loops).
(6) Problem associated with sequence event recorder.
(7) Crash rated active vehicle barrier opens and closes, but does not perform the operation in a smooth manner.
(8) Problem associated with wrong-way detection system.
(9) Problem associated with overspeed detection system.

Code 3-Active vehicle barrier system (controls and barrier)
(10) Warning beacon(s) is not operational.
(11) Active vehicle barrier warning light(s) or in-pavement light(s) are not operational.
(12) Any item associated with a control system malfunction (example indicating light or warning buzzer) that does not have a direct impact on operating the crash rated active vehicle barriers.

1.16.2 Service Call Requests

Record separately each service call request, as received. Provide a form that includes the serial number identifying the component involved, its location, date and time the call was received, specific nature of trouble, names of service personnel assigned to the task, instructions describing what has to be done, the amount and nature of the material to be used, the time and date work started, and the time and date of completion. Deliver a record of the work performed within 5 days after work is accomplished.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

Furnish and install a complete and functional crash rated active vehicle barrier system for the ACP/ECF including crash rated active vehicle barriers, active vehicle barrier controls, traffic signals, traffic signal controls, traffic warning signals, traffic signs and pavement markings, actuated traffic arms, wrong-way detectors, vehicle presence detectors, tamper switches, alarm displays, sequence of events recorder, data transmission, and all interconnecting conduit and wiring. Crash rated active vehicle barrier types covered by this specification include retractable barriers.

2.2 CRASH RATED ACTIVE VEHICLE BARRIER SAFETY SCHEME

Install and program the Hybrid Beacon safety scheme, as approved by the Surface Development and Distribution Command (SDDC) to ensure the safety of innocent motorists. See Appendix A and the contract drawings for the required features and operational sequences of this safety scheme.

2.3 CRASH RATED ACTIVE VEHICLE BARRIER FEATURES

2.3.1 Impact Conditions

The crash rated active vehicle barriers are to withstand an impact corresponding to ASTM F2656/F2656M, Impact Condition OF M50where the letter(s) correspond to the test vehicle and the last two digits correspond to the test velocity in mphorDOS K12.

2.3.2 Penetration Rating

When subjected to the specified Impact Condition, vehicle barriers are to respond with Penetration Rating equal to or better than P2as defined in ASTM F2656/F2656M.

For DOD certified barriers, use the Penetration Rating of L2.0 or better.

2.3.3 Operators

Provide electric (electromechanical) crash rated active vehicle barriers.

2.3.4 Vehicle Loads

14515 kg 32,000 pound axle load or a 16,000 pound wheel load.

2.3.5 Roadway Obstruction

When a barrier is in the "Access Allowed" position, no element in the drive path is to extend above the surrounding grade. Taper all changes in grade.

2.3.6 Dimension Requirements

Provide crash rated active vehicle barrier dimensions with the same dimensions of the barrier tested in the Proof of Performance test(s) and as documented and described in the DOS or DOD Certification Letter.

2.3.7 Operation Speeds Excluding Crash Gates

a. When in manual mode (normal mode), the time to transition to "deny access" is 8 seconds or less and the time to "allow access" is 3 seconds or less.

b. Emergency Fast Operation (EFO) time is to be 2 seconds or less.

c. When the barrier is transitioning from the "deny access" position to the "allow access" position, the barrier is to be reversible when EFO is initiated.

2.3.8 Failure Modes of Operation

Design the system to remain in the last commanded position in the event of electrical failure.

a. Design the system so that unauthorized personnel cannot manually manipulate the barrier into the "access allowed" position in the event of a power outage. Locks and tamperproof screws and bolts are examples of acceptable means to prevent unauthorized access.

b. Design the system to allow authorized personnel to manually manipulate the barrier into the "access allowed" and "access denied" position in the event of a power outage or operator failure. Barriers are to be capable of being raised and lowered using a recessed handle on the top surface of the barrier or a manual hydraulic pump or other means when the hydraulics or electric motors are not operational. The operation is to require no more than 60 pounds of force to operate.

c. Design the system to maintain the barriers in the raised position, without inspection, for periods of time of up to 1 week.

2.3.9 Crash Rated Active Vehicle Barrier Foundations

Foundation systems are to be shallow with required depths no more than 24 inches.

2.3.10 Lane Coverage

Provide and install a quantity of 2 fixed-width barrier to protect 2 roadway lanes.

2.3.11 SAFETY EQUIPMENT

Provide a safety bar with each retractable or raising crash beam barrier to secure the barrier in the open position during maintenance operations. Provide other equipment recommended for safety when working on the barrier.

2.4 CRASH RATED ACTIVE VEHICLE BARRIER(S)

2.4.1 RETRACTABLE BARRIERS

In addition to meeting the design and performance requirements of this SECTION, retractable barrier systems are to conform to the following system-specific requirements.

Barrier is to be electromechanical with no hydraulic fluid or pneumatics used.

2.4.1.1 Configuration

Retractable barriers are to be made of steel plate, rotating steel wedges,or steel frames.

2.4.1.2 Buttresses

Do not provide above-grade buttresses with the retractable barriers.

2.4.1.3 Powered Retractable Barrier

Provide a retractable barrier that is capable of 300 complete up/down cycles per hour. Provide a retractable barrier where the motion of the barrier can be stopped and reversed prior to it becoming fully open or fully closed.

2.5 POWER UNIT

2.5.1 ELECTRIC POWER UNIT ENCLOSURE

Provide a NEMA Type 3R enclosure as specified in NEMA 250 to enclose the electric power unit. Design the enclosure for easy removal of the power unit and other accessories without complete removal of the enclosure. Provide an access door with hinges and an inside and outside operable/lockable (exterior) door latch. Place and configure equipment within the enclosure so that all periodic maintenance can be performed through the access door without removal of the equipment. Equip the enclosure with weatherproof louver vents appropriately sized and located to dissipate internal heat generation.

2.6 HEATER

Provide a waterproof barrier heater with a thermostat control and NEMA 4 junction box connection point for de-icing and snow melting. Provide a heater that ensures proper barrier operation is maintained down to an ambient temperature of minus 40 degrees F.

Provide heat tape in the drain pipe system that is controlled by the same thermostat for the barrier heater or by a separate thermostat.

2.7 FINISH AND MARKINGS

Provide signs and markings that meet retroreflectivity requirements as contained in the MUTCD under Part 2 Signs sections on 'Retroreflectivity', 'Maintaining Minimum Retroreflectivity', and 'Shapes' plus ensure all state and local retroreflectivity requirements are satisfied. Paint surfaces in accordance with requirements of Section 09 90 00 PAINTS AND COATINGS.

Use red and white stripe marking on all crash rated active vehicle barriers and actuated traffic arms as required for a stop condition by AASHTO RSDG-4. Provide vertical striping and lights (unless otherwise noted in this

SECTION) as per MUTCD Part 8B Signs and Markings, Section on 'Crossbuck Assemblies with YIELD or STOP Signs at Passive Grade Crossings'.

a. Paint wedge type barriers with vertical red/white alternating retroreflective striping that is approximately 16 inch wide and covers the entire exposed area of the barrier. Since barriers will vary in width, the striping can be adjusted wider or narrower to have it work so each stripe is the same width.

Provide markings on both the front and back of the crash rated active vehicle barriers. Provide non-skid, durable markings that are part of the roadway (i.e. backside of plate barriers or the top of retractable bollards), and ensure retroreflectivity is maintained based on expected traffic flow (see paragraph PROJECT/SITE CONDITIONS of this SECTION) for a minimum of two years.

Markings on surfaces that are not part of the roadway must meet requirements of ASTM D4956, Type III or better and MUTCD.

Provide signing as shown in the drawings. A minimum sign sheeting of MUTCD Part 6F Temporary Traffic Control Device Zone Devices, Section on Channelizing Devices, Type III sign sheeting is to be used for regulatory and warning signs. Provide all sign posts with a breakaway design as set forth in AASHTO RSDG-4 or as required by the local/State Department of Transportation.

Provide a retroreflective white pavement marking envelope consisting of 12 inches wide white stripes at 45 degree angle separated by a 24 inches clear space at the crash rated active vehicle barriers. Provide an envelope that is full lane width and at least 8 feet in length.

2.8 ACTIVE VEHICLE BARRIER CONTROL SYSTEM (AVBCS)

2.8.1 General Requirements

The AVBCS provides alarm, status, and control information to the Master Control Panel, Guard Booth Control(s) (panels and buttons), Search Area Control Panel(s), Overwatch Position Control Panel, and the Local Control Panel(s). A full layout showing the location of the controllers is required. A controller that is installed in a facility requires a complete layout of all equipment to be placed in the room/area to ensure all clearances are maintained. This layout is part of the shop drawings submittal. The control system contains all relays, timers, and other devices and an industrial programmable controller programmed as necessary for the barrier operation. The control panel allows direct interface with auxiliary equipment such as card readers, remote switches, loop detectors, infrared sensors, and slidingswinging gate limit switches. Provide logic to coordinate the barricade and the traffic lights.

2.8.2 System Integration

Provide the AVBCS as an integrated system, including all sub systems specified hereafter. AVBCS hardware and software integration is required to function as one integrated system. The Contractor is responsible for all integration and appetencies required for the system to behave as one

system. Supply of separate sub systems without integration is not acceptable. The extent and nature of integration must be extensively documented and demonstrated in the Technical Data and Software Package. ***The system is configured with industrial programmable logic controllers.***

2.8.3 AVBCS Processor

The AVBCS processor consists of a combination of controllers located within the ACP/ECF that work with the various hand machine interface operating panels that are either hard control panels (discrete switches, buttons and indicating lights) or touchscreen control panel(s) or a combination of both touchscreen and hard control items.

a. A programmable logic controller (PLC) meeting the requirements listed herein. Provide the PLC or PLCs with the latest software version. This is the main overall controller for the AVBCS.

b. Wrong-way controllers are to work in unison with the system to provide the appropriate alarms.

c. Human Machine Interface: Contractor allowed the option to provide either hard control or touchscreen control or a combination of the two systems; however, EFO is to be hard control panel operator interface.

d. Vehicle Presence Detection: Controller that operate the vehicle presence detection system(s) are to work in unison with the overall system to provide the appropriate response.

e. Computer control. Controller(s) that are computers (not a PLC or traffic control unit) are not allowed.

f. Traffic Control Unit. A traffic control unit is to be used when the crash rated active vehicle barrier traffic signals are co-located at an intersection. The traffic control unit is, as a minimum, control the intersection traffic signals and is to interface with the crash rated active vehicle barrier control system.

2.8.4 PROGRAMMABLE LOGIC CONTROLLER (PLC)

2.8.4.1 PLC General Requirements

PLCs area digitally operating electronic apparatus that use a programmable memory for internal storage of instructions for implementing specific functions such as logic, sequencing, timing, counting, and arithmetic though digital or analog input/output modules. PLCs are capable of receiving discrete and analog inputs and, through programming, and are able to control discrete and analog output functions, perform data handling operations and communicate with external devices. Provide PLCs that meet the requirements of Class A computing devices, and are labeled as set forth in 47 CFR 15 and are able to withstand conducted susceptibility test as outlined in NEMA ICS 1, NEMA ICS 2, andIEEE C37.90.1. Provide PLCs that function properly at temperatures between 32 and 122 degrees F at 5 to 95 percent relative humidity non-condensing and tolerate storage temperatures between minus 40 and plus 140 degrees F at 5 to 95 percent relative humidity non-condensing. Provide an intelligent process controller that can perform both data acquisition and process control functions that has the ability to function independently; that is, perform its function without

the need for commands from a separate computer.

2.8.4.2 Modular PLC

Provide PLCs that are based on a modular, field expandable design allowing the system to be tailored to the process control application. The system is expandable through the use of additional hardware and/or user software. As a minimum, provide the PLC with a mounting backplane, power supply module, central processing unit (CPU) module, communications module, and input/output (I/O) module. Group modules together in a mounting rack or cabinet. Ensure the mounting rack backplane provides the communications mechanism to fully integrate the individual modules located within the rack. Provide modules that plug directly into the backplane. The use of wire connectors between modules is not be allowed. Provide a rack or cabinet sized as needed to hold the equipment necessary while performing the required control functions. The system configuration allows for the removal and/or installation of modules under power.

2.8.4.2.1 Central Processing Unit (CPU) Module

The CPU module is a self contained, microprocessor based unit that provides time of day, scanning, application (ladder rung logic) program execution, storage of application programs, storage of numerical values related to the application process and logic, I/O bus traffic control, peripheral and external device communications and self diagnostics.

a. Provide a processor with battery backed static RAM to hold application programs. Provide a battery that is serviceable without taking the processor module out of service. Provide a monitoring system that monitors the battery for a low voltage condition. Provide a low voltage status bit for use by the PLC program.

b. Provide the processor with illuminated indicators readable from the front of the processor module for diagnostics. Provide diagnostic status bits for use by the PLC program.

2.8.4.2.2 Communications Module

Provide a communications module that allows peer-to-peer communication with other PLCs and allows the PLC to communicate with the workstation. Provide a communication module that utilizes the manufacturer's standard communication architecture and protocol, Ethernet architecture and protocol or a combination of these. The communication module is to allow programming of the PLC to be done locally through the use of a laptop computer.

2.8.4.2.3 Power Supply Module

Provide one or more power supply modules as necessary to power other modules installed in the same cabinet. Provide power supply modules that plug directly into the backplane. Auxiliary power supplies may be used to supply power to remote cabinets or modules.

a. Provide power supply modules that use AC power with a nominal voltage of 120 VAC plus or minus 5 percent. The power supply module is to monitor the incoming line voltage level and provide over current and over voltage protection. If the voltage level is detected as being out

of range the power supply module continues to provide power for an adequate amount of time to allow for a safe and orderly shutdown. Power supply modules are capable of withstanding a power loss for a minimum of 20 milliseconds while still remaining in operation and providing adequate power to all connected modules.

b. Provide each power supply module with an on-off switch integral to the module. If the manufacturer's standard power supply module is not provided with an on-off switch, install a miniature toggle type switch near the PLC and clearly labeled the switch as to its function.

c. Provide power supply modules with an indicating light that is lit when the module is operating properly.

2.8.4.2.4 Input/Output (I/O) Modules

I/O Modules are self contained, microprocessor based units that provide an interface to field devices. Locate the I/O modules in the same mounting rack as the other PLC components. The unit is to plug directly into the backplane of the mounting rack. Each module is to contain visual indication to display the on-off status of individual inputs or outputs. All modules are to be mechanically keyed between the I/O module and the terminal strip to ensure the wiring and modules are correctly matched. Extensive diagnostic indicators are to be available on each module including information on the state of the I/O, along with specific module by module special features such as field wiring faults, blown fuses, and over/under voltage range information.

2.8.4.3 Program Storage/Memory Requirements

The CPU utilizes the manufacturer's standard non-volatile memory for the operating system. Provide the controller with electronically erasable, programmable, read only memory (EPROM) for storage of user programs and battery backed RAM for application memory. The EPROM is loaded through the controller keypad or through the use of a laptop computer. The CPU memory capacity is based on the system's control requirements. The memory capacity is sized such that, when the system is completely programmed and functional, no more than 50 percent of the memory allocated for these purposes is used.

2.8.4.4 Input/Output Characteristics

Each controller allows for analog input, analog output, discrete input and discrete output. The number and type of inputs and outputs for the system is as shown on the drawings or described herein and is to comply with the sequence of control. Include in the system capacity a minimum of 20 percent spare input and output points (no less than two points) for each point type provided. During normal operation, a malfunction in any input/output channel is to affect the operation of that channel only and must not affect the operation of the CPU or any other channel. Analog input circuits are available in +/-10V, +/-5V, 0-10V, 0-5V, or 4-20 mA. Discrete input circuits are available in 5 volt TTL, 10-30 VDC, 18-26 VDC, or 79-132 VAC. Provide all input circuits with a minimum optical isolation of 1500 VRMS and be filtered to guard against high voltage transients from the externally connected devices. Analog output circuits are to be available in +/-10V or 4-20 mA. Discrete output circuits are to be available in 5 volt TTL, 10-30 VDC, 18-26 VDC, or 79-132 VAC. Provide all output circuits with a minimum optical isolation of 1500 VRMS and filter to

guard against high voltage transients from the externally connected devices. Provide a PLC that is able to communicate with a computer or other PLC's via fiber optic cable or copper cable. Provide a PLC processor that is able to process data from Remote Input/Output modules via fiber optic cable or copper cable. Ensure remote Input/Output modules do not require individual programming to function.

2.8.4.5 Wiring Connections

Provide wiring connections that are heavy duty, self lifting, pressure type screw terminals to provide easy wire insertion and secure connections. Provide terminals that accept two #14 AWG wires. Provide a hinged protective cover over the wiring connections. Provide write-on areas for identification of the external circuits on the cover.

2.8.4.6 On-Off Switch

Provide each controller with an integral on-off power switch. If the controller is not provided with a manufacturer's standard on-off switch, then install a miniature toggle type switch in the control panel near the controller and clearly labeled the switch as to its function.

2.8.4.7 Diagnostics

Provide each PLC with diagnostic routines implemented in firmware. The CPU is to continuously perform self-diagnostic routines that will provide information on the configuration and status of the CPU, memory, communications and input/output. The diagnostic routines are to be regularly performed during normal system operation. Provide a portion of the scan time of the controller dedicated to performing these housekeeping functions. In addition, provide a more extensive diagnostic routine that is performed at power up and during normal system shutdown. The CPU is to log input/output and system faults in fault tables which are accessible for display. When a fault affects input/output or communications modules the CPU is to shut down only the hardware affected and continue operation by utilizing the healthy system components. Annunciate all faults at master control panel and at the PLC.

2.8.4.8 Accuracy

Provide controllers with an accuracy of plus or minus 0.25 percent of input span.

2.8.5 PLC SOFTWARE

Furnish all PLC software described in this specification as part of the complete control system.

2.8.5.1 Operating System

Provide each PLC with the manufacturer's standard operating system software package. Maintain a point database in its memory that includes all parameters, constraints and the latest value or status of all points connected to the PLC. Use the data in memory resident files for the execution of the PLC application programs. The operating system must support a full compliment of process control functions. It is possible to define these functions using a mix of function blocks, ladder logic

diagrams, sequential function charts and text programming. Base programming methods and interactions on IEC 61131-3. A combination of the programming methods is to be possible within a single controller. The operating system allows loading of software locally. The operating system supports data entry and diagnostics using an operator interface panel attached directly to the PLC. Each PLC is be capable of operating in stand alone mode.

2.8.5.1.1 Startup

Provide the PLC with startup software that causes automatic commencement of operation without human intervention, including startup of all connected I/O functions. A PLC restart program based on detection of power failure at the PLC is to be included in the PLC software. The restart program includes start time delays between successive commands to prevent demand surges or overload trips.

2.8.5.1.2 Failure Mode

Upon failure for any reason, each PLC is to perform an orderly shutdown and force all PLC outputs to a predetermined (failure mode) state, consistent with the failure modes shown and the associated control device.

2.8.5.2 Functions

Provide a controller operating system that is able to scan inputs, control outputs, and read and write to its internal memory in order to perform the required control as indicated in the sequence of control on the drawings. The controller periodically perform self diagnostics to verify that it is functioning properly.

2.8.5.2.1 Analog Monitoring

The system measures and transmits all analog values including calculated analog points.

2.8.5.2.2 Logic (Virtual)

Logic (virtual) points are software points entered in the point database which are not directly associated with a physical I/O function. Logic (virtual) points can be analog or digital points created by calculation from any combination of digital and analog points, or other data having all the properties of real points, including alarms, without the associated hardware. Logic (virtual) points are defined or calculated and entered into the database. The calculated analog point has point identification in the same format as any other analog point.

2.8.5.2.3 State Variables

If an analog point represents more than two (up to 8) specific states, each state is to be nameable.

2.8.5.2.4 Analog Totalization

Any analog point is to be operator assignable to the totalization program. Up to eight analog values are to be totalized within a selectable time period.

2.8.5.3 Alarm Processing

Provide each PLC with alarm processing software for analog input, digital input, and pulse accumulator alarms for all real and virtual points connected to that PLC.

2.8.6 AVB Control System Processing and Control Software

2.8.6.1 General

Specific functions to be implemented are defined in individual system control sequences and database tables shown on the drawings and herein. Provide software that provides the communication, programming and control capabilities necessary to support all specified points and functions, plus a minimum expansion of 25 percent of the current number of points complete with their point database. Provide a controller that is online at all times and performs all required functions as specified. Provide software that consists of custom-developed code and/or one or more standard software modules. Where multiple modules are used, the modules need to be capable of sharing data and operating together seamlessly. Provide a system that supports multiple user operations with multiple tasks for each user and supports operation and management of all peripheral devices. Provide a system that allows on-line configuration modifications, while the system is operating. Provide software with complete user documentation online, including examples of how to operate the various modules within the software. Supply all documentation implemented software, including the custom-developed software codes to the Contracting Officer after formal system acceptance. The Contracting Officer has the right of use for the provided software for future enhancements and additions to the installed system. Ensure the AVB control system does not contain proprietary code or passwords that limit work to be done exclusively by a manufacturer of the product. Provide open source code.

2.8.6.2 Resident Application Software

Provide resident applications programs developed in accordance with paragraph Graphical Object Oriented Programming to achieve the sequences of operation, parameters, constraints, and interlocks necessary to provide control of the systems connected to the control system. All application programs are resident in the PLC and are to execute in the PLC, and coordinate with each other, to insure that no conflicts or contentions remain unresolved.

2.8.6.3 Display Information

Provide information necessary to support all requirements specified at the AVBCS display, including: guard control commands; alarm notification; status point changes; and report generation

2.8.6.4 Graphical Object Oriented Programming

Provide a system that includes a graphical object oriented programming function which is used to create all control sequences utilized in the control panels. The graphical object oriented programming function provides programming elements to be connected together to create a logic diagram. The diagram must be compliable to produce executable code for the control panel. Provide a graphical object oriented programming function that includes elements necessary to create logic diagrams that represent

sequences of operation. Provide program elements that are able to be combined into a custom template which can then be used as a standard function.

2.8.6.5 Command Software

The Provide software for defining and selecting I/O, parameters, and all other functions associated with operation. The operator commands must be usable from keyboards with individual operator passwords as specified. Store the database in non-volatile RAM or other approved means. Static database must downloadable to backup devices.

2.8.6.6 Command Input and Errors

Provide command menus that utilize full words and acronyms selected to allow programmers/technicians to use the AVBCS without extensive training or data processing backgrounds. The AVBCS will issue a prompt to the programmer/technician. Insure the AVBCS supervise programmer/technician inputs to ensure they are correct for proper execution. Insure programmer/technician input assistance is provided whenever a command cannot be executed because of input errors.

2.8.6.7 Special Functions

The AVBCS supports the following special functions by using a mouse or touchscreen, in addition to all other commands specified:

a. The Help display will produce a display of all commands available to the operator. The help command, followed by a specific command, produces a context sensitive listing with a short explanation of the purpose, use, and system reaction to that command.

b. Print Report allows the operator to print reports.

2.8.6.8 Alarms

The software alarms is to notify a programmer/technician of the occurrence of an alarm condition. The AVBCS alarm history are to be stored, to be re callable by the programmer/technician using the report generator. Alarm messages take precedence over other functions. A minimum of the most recent 1000 alarms must be directly available at the AVBCS. Within the alarm response time digital alarms are subject to immediate reporting, within the alarm response time.

2.8.6.9 Report Generator

Provide software to generate and format standard and custom reports for displaying and storing on disk. Database values and parameters, values calculated using the real time static database or historical data base; with the reports subsequently stored on removable media to generate reports. Do not interrupt dynamic operation of the system to generate a report. Provide the report with the time and date when the report was printed.

2.8.6.10 Periodic Automatic Report

The system allows for specifying, modifying, or inhibiting the report to

be generated, the time the initial report is to be generated, the time interval between reports, end of period, and the output peripheral. The system (through the Request Report Mode) allows for the operator to request, at any time, an immediate display of any report.

2.8.6.11 Historical Data Storage and Retrieval

Provide a historical data storage and retrieval function used to collect and store dynamic data. This function is in addition to other data storage requirements. The function must have the capability to collect and store alarm status changes, point values, events and operator commands, and system responses. Provide this function with the capability to retain historical data on non-volatile RAM for pre-specified time periods, up to forty-five days using last day roll over, for short-term analysis, and then output the data to the utility software for long-term retention. Insure the operator is able to selectively recall short-term data stored on non volatile RAM. Using the data retrieval and report generation program retrieval of the contents of any selected historical data file through utility programs is available. The output of the report generation program must be capable of being viewed on the screen, transferred to removable media, or stored.

2.8.6.12 System Access Control

Provide a minimum of 10 passwords that is usable with the control system software. The AVBCS maintains a log of programmers/technicians logged onto the system. Define each password as to the functions that the programmer/technician can perform. The software must support a user based security system. The security system allows for the creation of users with certain rights and/or privileges,When enabled. When user based security is enabled, an audit trail must be generated in the system which tags every programmer/technician logon with user identification (ID). Support the following functions within the security management application:

a. Define users.

b. Define groups which users may belong to.

c. Define user and/or group rights/privileges.

2.8.6.13 Convenience Outlet

Provide a 120 volt ac, 15 amp, ground fault interruption (GFI) type duplex convenience outlet inside each cabinet that houses a PLC.

2.8.7 CONTROL PANEL(S)

Provide a master control panel to interface between all barrier control circuits, remote EFO control panels, remote EFO control buttons,wrong-way, auxiliary equipment, and the crash rated active vehicle barrier power units. Provide remote control panel(s)/buttons for each guard booth,search area,Overwatch. Provide remote local panel(s) at the barrier location to be used for maintenance purposes. Control circuits contain all relays, timers, and other devices or an industrial programmable controller programmed as necessary for the barrier operation. Provide a control panel that allows direct interface with auxiliary equipment such as card readers, remote switches, loop detectors, infrared sensors, and sliding or swinging

gate limit switches. Ensure loop controllers do not allow an automatic barrier raise following power loss or restoration. Run all device interconnect lines to terminal strips. Descriptions are primarily for discrete controls making up a given control panel. None of the panels have to be listed under UL 508; however some components may have to meet certain requiremnet of the document as indicated elsewhere. If allowing or using touchscreen control instead, see paragraph "Touchscreen" for revised requirements. Provide control panels as shown on the drawings and as described in Appendix A. rovide control panels as shown on the drawings. rovide control panels as described in Appendix A.

2.8.7.1 Master Control Panel

Provide a master control panel with all necessary displays and controls to allow the operator to view real-time alarms, discrete point status changes, to control crash rated active vehicle barriers and related equipment. Locate the master control panel as shown on the drawings in a manner to allow the operator to easily use the controls and monitor the displays while, at the same time, oversee entry and exit operations. Permanently label all control panel indicator lights, push buttons, and switches on the console. Provide master control panel as shown on the drawings.

2.8.7.2 Remote EFO Control Panel - Primary

This panel is intended to be installed at each overwatch position. The panel operating panel is to be installed within a lockable cabinet when at a paved position; otherwise, place operating panel in the overwatch booth. Provide as shown on the drawings.

2.8.7.3 Remote EFO Control Panel - Secondary

This panel is intended to be installed in each Guard Booth. Provide as shown on the drawings.

2.8.7.4 Remote EFO Control Button

This EFO control button is intended to be installed at each Guard Booth. Provide as shown on the drawings.
a.

2.8.7.5 Remote - Local Control Panel

This Remote Control Panel does not haven an EFO. The panel is to be located within a cabinet located near the crash-rated active vehicle barrier that is lockable. Provide Local Remote Control Panel(s) as shown on the drawings.

2.8.7.6 Keys for Switches

Provide keyed switches and keys as shown on the drawings and required in Appendix A. Provide keyed switches and keys as shown on the drawings. Provide keyed switches and keys as described in Appendix A. The Control Panel(s) include keyed switches with keys per the following:

a. Each master control panel switch operable by a unique key.

b. Master control panel mode switch key removable in all modes"EFO", "Test", "Local"mode(s) only.

c. Local panel mode selector switch with key removable in (all modes"Off", "Local".

d. Master control panel mode selector switch for a specific barrier direction of travel is to match the corresponding Local Control Panel mode selector switch for the same barrier. The master control panel mode selector switch and the local control panel switch are keyed the same.

e. Key removable only in offposition.

2.8.8 VOLTAGE

The control circuit operates from a 120volt 60 Hz supply. Provide control circuits that have a voltage rating of 24 dc for all external control panels.

2.8.9 SEQUENCE OF EVENTS RECORDER

All alarms and events listed in Appendix B must be collected by the AVBCS and stored with the following data: identification of the alarm/event, date and time to the nearest second of occurrence, date and time of acknowledgement (alarm points only), date and time of reset (alarm points only), and an alarm/event message. Events may have multiple messages to describe all possible states, e.g., AVB #1 in EFO mode, AVB #1 in Test mode, or AVB #1 in Local mode, EFO Guard booth 1 activated. Provide means and user-initiated procedure to export the stored alarms and events to a removable storage device for printing in a standard Windows application such as a spreadsheet. Receive and store all alarms and status changes in the AVBCS database with the appropriate time tags in no more than 100 milliseconds after the condition occurs (e.g., alarm/status point contact closure).

2.8.10 ALARM DISPLAY PANELS AT THE ID CHECK AREA AND SEARCH AREA(S)

Mount one or more Alarm Display Panels consisting of back-lit or LED WRONG WAY messages outside of but near the guard booths at the ID Check Area. Mount so that the guards can see the message boards while looking toward the on-coming traffic. Include an adjustable audible alarm with the each alarm panel. Provide and locate a sufficient number of alarm panels to ensure any ACP/ECF guard either sitting in a guard booth or standing outside the guard booth can see and hear at least one panel. Provide an adjustable audible alarm that is loud enough to be heard over ambient traffic noise. wrong-way alarms clear automatically 3 seconds (adjustable) after the alarm condition ends with no action required by guard. Record wrong-way alarms on the Alarm and Events Recorder.

2.8.11 Control Panel Components and Construction

2.8.11.1 Enclosures

Each control panel enclosure is to conform to the requirements of NEMA 250

for the types specified. Provide the manufacturer's standard finish color, unless otherwise indicated. Repair and refinish damaged using original type finish. Provide Type 12 enclosures for installation in equipment rooms; those for installation in clean, dry indoor occupied space may be Type 1; other locations are as otherwise specified or shown. Provide Type 4 or as shown, enclosures for equipment installed outdoors. Provide Type 4X enclosures for installation in corrosive environment and construct of stainless steel . Painted steel is not be allowed for use in a corrosive environment. Provide enclosure with a single, continuously hinged exterior door with print pocket, 3-point latching mechanism and key lock and a single, continuously hinged interior door. Provide panels that are mounted on flat horizontal surface with a top that is tilted at 45 degrees or 60 degrees (unless a panel is wall mounted) to ensure easy viewing of the controls. Secure the control panel to the surface it is mounted.

2.8.11.2 Controllers

Provide controllers per paragraph programmable logic controller (PLC).

2.8.11.3 Standard Indicator Light

Provide indicator lights that comply with NEMA ICS 1, NEMA ICS 2, and UL 508. Provide lights that are heavy-duty, round are no smaller than 0.315 inch and no larger than 0.875 inch for alarm indicator, crash rated active vehicle barrier position indicator and EFO activation. Provide lights of the same size and type indicated for alarm indicator. Provide long-life LED type indicator lights that operate at 120 VAC or 24 VDC. Provide indicator light with a legend plate labeled as shown on the drawings. Provide the indicated lens color as shown on the drawings or specified herein. Provide panels with an overall "Push to Test" pushbutton or provide lights that are push to test (lamp) type. It is allowed to provide illuminated pushbuttons instead of a separate visual indicator.

2.8.11.4 Selector Switches

Selector switches must comply with NEMA ICS 1, NEMA ICS 2 and UL 508. Provide selector switches that are heavy duty, round and mount in a 0.875 inch mounting hole. Provide the number of positions as indicated on the drawings or specified herein. Provide switches as indicated on the drawings or specified herein. Provide switches that are rated for 600 volts, 10 amperes continuous. Provide selector switches with a legend plate labeled as shown on the drawings or specified herein. Where indicated or required, Provide dual auxiliary contacts for the automatic position where indicated or required, to provide position sensing at the workstation. Auxiliary contacts that are rated for 120 VAC, 1A as a minimum. Provide key operated switches where indicated on the drawings or specified herein. All keys are to be identical unless indicated on the drawings or specified herein to have different keying.

2.8.11.5 Push Buttons

Push buttons must comply with NEMA ICS 1, NEMA ICS 2 and UL 508. Provide push buttons that are heavy duty, round and mount in a 0.875 inch mounting hole. Provide the number and type of contacts as indicated on the drawings or required by the Sequence of Control. Provide push buttons that are rated for 600 volts, 10 amperes continuous. Provide push buttons with a legend plate labeled as shown on the drawings.

2.8.11.6 Relays

Relays must comply with IEEE C37.90 and derated for altitude above 4921 feet. Provide relays that are as required by the Sequence of Control. Provide relay coils that are rated120 VAC that coordinates with the controls] and provide with matching mounting socket. Ensure power consumption is not greater than 3 watts.

2.8.11.7 Terminal Blocks

Terminal blocks must comply with NEMA ICS 4 and UL 1059. Provide terminal blocks for conductors exiting control panels that are two-way type with double terminals, one for internal wiring connections and the other for external wiring connections. Provide terminal blocks made of Bakelite or other suitable insulating material with full deep barriers between each pair of terminals. Provide a terminal identification strip that forms part of the terminal block and each terminal must be identified by a number in accordance with the numbering scheme on the approved wiring diagrams.

2.8.11.8 Alarm Horns

Provide alarm horns where indicated on the drawings or where required in Appendix A. Provide horns that are vibrating type and comply with UL 508. Provide horns with a 100 dB at 10 feet rating. Provide horns with a means to adjust the volume level. Exterior horns are to be weather proof by design or be mounted in a weather proof enclosure that does not reduce the effectiveness of the horn. Horn is to be set to go off for 10 seconds after an EFO is activated.2.8.11.9 Alarm Buzzer

Provide warning alarm piezoelectric buzzer at the master control panel and other panels where indicated on the drawings and specified herein. Provide round buzzer that mounts mount in a 0.875 inch mounting hole. Provide buzzers with a Maximum 100 dB at 39 inch. Provide buzzer with a means to adjust the volume level and with selectable alarm tones.

2.8.11.10 Touchscreen

EFO function is to be done by a discrete pushbutton/switch and is not allowed to be done on the touchscreen. The power on/off is to consists of a keyed switch and is not allowed to be done with the touchscreen. The Contractor has the option to provide a touchscreen to perform the functions of the master control panel. The master control panel graphical user interface is to show the layout of the ACP/ECF and have different screens that allow the user to go to specific areas to perform the operation.The master control panel graphical user interface is to show pushbuttons and lights in graphical format. The minimum size for the touchscreen is 15 inches for the master control panel. Other panels are allowed to go down to 7 inches. A sequence of operation is required to be finalized prior to equipment receiving final approval. The sequence of operation is to clearly describe symbology to be used, the operation to include description of use of pins/passwords, description of how the master control panel and local maintenance panel(s) will perform the lock out procedure, and a description with sketched layouts of the various screens that will be programmed. This sequence of operation is to be approved prior to submitting for approval any testing plan. Screen shots are to be submitted for review and approval as part of the panel layouts. Provide symbology as indicated:

a. Show the crash rated active vehicle barrier graphically.

b. Red circular symbol to "push" for closing. Green circular symbol to "push" to open.

c. Green rectangle with black lettering for changing between operating modes. When going between different operating modes, a different screen is to show. Items that do not function are not shown or can be grayed out on the screen if approved. If going between modes and the system is in the incorrect configuration, an alarm box stating "Incorrect Configuration" is to pop-up.

d. EFO Activation triggers a red square with the wording "Warning Emergency Fast Operate Activated".

e. EFO Reset will be a green square with the wording "Press to Reset EFO". This opens a screen with a keypad to enter the pin to reset the EFO.

f. Control systems that have different operating modes will have the modes on different screens or some means to clearly shown on the screen which mode the panel is currently operating.

g. Local mode, when using discrete components, uses a key to do a lock-out/tag-out type application to ensure the maintenance worker has full control. When using a touch screen, a keyed approach can still be used as well as a password approach. No matter the solution, it is imperative that it require an action done by the guard or maintenance worker at the master control panel and then at the Local control panel to achieve full control. A solution that has only a unique password at the Local control panel is not allowed.

h. The main screen is required, as a minimum, to show all the barriers position, the operating mode that each barrier is in, vehicle presence detection alarm for each barrier, EFO activation, ability to change screens icon, and all other alarms unless a general alarm is used instead where one can go to an alarm screen to see the individual alarms.

i. Subscreens are to have an icon (pushbutton) that states "Return to Main Screen".

j. AVB mode operation is to be by direciton of travel and not by individual AVBs.

k. Provide a separate screen for the arm/disarm of the remote EFOs.

l. Master control panel is to to have a means for the operator to tell which EFO was activated.

2.8.11.11 Wiring

Wired, with multiconductor cable secured to underside of panel with straps at 1-inch maximum intervals and extra straps and cable sheath reinforcing sleeve where conductors break out for connections. Provide solderless, quick-disconnect, plug or sleeve connectors.

2.9 SEQUENCE OF OPERATION

Refer to Appendix A and the drawings for Sequence of Operation requirements.

2.10 AVB LIGHTING

Provide all crash rated active vehicle barriers with red warning flashing warning beacons mounted on the crash rated active vehicle barrier itself unless it is not practical as in the case of a net type. Provide LED type luminaires that have a lumen output sufficient to see easily at 200 feet. These luminaires are located on the face of the barrier that faces toward off-post (nonsecure side). Luminaires are to be on anytime the barrier is not fully open.

Provide the number and spacing of lights to meet the following requirements:

a. Plate, drum or frame barrier systems equal to or greater than 3 feet in width will include, as a minimum, 3 red lights. One will be mounted within 1 foot of each barrier edge and one will be mounted within 1 foot of barrier centerline.

b. Plate, drum or frame barrier systems less than 3 feet in width will include, as a minimum, 1 red light. One light will be mounted within 1 foot of the barrier centerline. Frame type barriers are allowed instead of the configuration described can have a light on each post/finger of the barrier If the frame type barrier does not have three or more lights visible, then in-pavement lights are required..

2.11 WARNING BEACONS

The warning beacon or wig-wag must be as shown on the drawings and is to include two alternately flashing signal sections. Provide each signal section with a standard traffic signal face with a flashing CIRCULAR YELLOW signal indication. Mount signal sections horizontally on the warning beacon. The visible diameter of each signal section is not to be less than 8 inch. When illuminated, the beacon must be clearly visible, to all drivers it faces, for a distance of at least 1 mile under normal atmospheric conditions unless otherwise physically obstructed. Provide the yellow lens color to meet the requirements of MUTCD. Provide all flashing contacts with filters for suppression of radio interference. Provide beacons that flash at a rate of not less than 50 nor more than 60 times per minute. The illuminated period of each flash is 1/2 of the total cycle for each signal section. Provide a beacon this is programmable and in order to permit continuous non-flashing operation through a supervisory signal from the Traffic Controller Unit (CU). Provide day-light sensor and an automatic dimming system to reduce the brilliance of the beacon.

2.12 BLANK-OUT SIGNS

Provide the blank-out sign with LEDs that have a lifetime of 80,000 hours or better. Automatic dimming is to adjust to ambient light levels. Flashing circuits are to be adjustable. Sign is to be NEMA 4 or 4X. Sign housing is to be constructed of extruded aluminum or stainless steel with gasket seals around the doors and lens. At full intensity, the sign is to be highly visible anywhere within a 15 degree cone centered about the optic axis. LED assemblies are removable and replaceable with simple hand tools. Provide a sign that is rated to operate in a temperature range of -35F to 165F.

2.13 TRAFFIC SIGNALS/HYBRID BEACON TRAFFIC SIGNALS

Provide traffic signals with light emitting diode (LED) signal modules. The term "LED signal module" in this text refers to an array of LEDs and lens that are capable of providing a circular signal indication as specified herein and shown on the drawings. All LED signal modules are to conform to the Equipment Standards of the Institute of Transportation Engineers (ITE), chapter 2a. The arrangement and size of signal indications for each LED signal module are as shown on the drawings and are to conform with MUTCD. Provide visors on each signal. Provide yellow housing color.

Supply red/yellow/green 12 inch traffic lights for each entrance and exit lanesas shown on the drawings or required by Appendix A to alert motorists of the barrier position. Supply all necessary brackets to allow the lights to be properly mounted. Use the green light to indicate that the barrier is fully open.

Hybrid Beacon. A three light hybrid beacon signal head over each inbound and outbound active barrier and on each post or only, only in special cases, post mounted only. Post mounted only requires two posts with each having a traffic signal. Supply red/yellow 12 inch traffic lights for each entrance and exit lanes to alert motorists of the barrier position. Signals are placed such that there are two red signals mounted side by side with a yellow signal centered below. Supply all necessary brackets to allow the lights to be properly mounted.

2.14 TRAFFIC SIGNAL SUPPORTS

Submit all traffic signal support design calculations as well as shop drawings to the government for review and acceptance prior to installation. Ensure compliance with AASHTO LTS and applicable local and state standard specifications for the design and installation of all traffic control supports. Traffic signal supports consist of tubular members, mast arms, pole shaft, base plates, anchor bolts assemblies, foundations as well as associated connections and appurtenances. Evaluate loading to be consistent with local and state guidelines. Determine ice and wind loads based on the geographic location of the installation in accordance with AASHTO LTS guidelines. Evaluate group loading analysis to be consistent with local and state guidelines and section 1.2.6 of AASHTO LTS. Allowable stress must be consistent with local and state guideline and section 1.4 of AASHTO LTS. Provide fatigue calculations that are consistent with local and state guideline and section 1.9.6 of AASHTO LTS. It is the Contractor's responsibility to conduct soil borings for foundation design; otherwise, conservative soils assumptions are to be used in calculating foundation requirements. If local and state guidelines provide foundations designs for design conditions, these guidelines may be used provided all loading and design conditions fall within guideline parameters. Before forming and placing concrete, inspect and evaluate each foundation excavation for the actual soil conditions encountered. Do not proceed with the work until the excavation is inspected and evaluated. If necessary, revise the foundation design based on the soil conditions encountered. Before submitting the revised design for approval, obtain the signature and seal of a Professional Engineer registered in the State.

Provide poles with oval-shaped handhole having a minimum clear opening of 2.5 by 5 inches. Secure handhole cover by stainless steel captive screws.

Provide metal poles with an internal grounding connection accessible from the handhole near the bottom of each pole. Provide a pole grounding connection designed to prevent electrolysis when used with copper ground wire. Provide steel poles having hot-dipped galvanized in accordance with ASTM A123/A123M and a color that matches adjacent site lighting factory finish. Do not install scratched, stained, chipped, or dented poles.

2.15 VEHICLE PRESENCE, WRONG-WAY DETECTORS

Provide sensors that are compatible with the barrier controller and that function as part of a complete barrier control system.

2.15.1 Photoelectric Type

Provide photoelectric sensors that meet the requirements listed below. Photoelectric sensors are used for vehicle presence detection and over-height detection as shown on the drawings.

a. Photoelectric detectors consist of separate transmitter and receiver units. Detector design or arrangement requiring reflector is not acceptable.

b. Light beam: laser or infrared, modulated and synchronized between the transmitter-receiver pair to minimize cross talk with adjacent detectors or other light sources. Where laser is used, provide a light source that is rated laser Class II or lower as per 21 CFR 1040 10.

c. Provide shield cones for beam path to minimize and isolate interference from other light sources outside the detector aim cone and from other adjacent light sources.

d. Provide a photoelectric detector set, including the mounting post that is of robust design to withstand mechanical abuse such as plowed snow from roadway snow removal operations.

e. Provide surge protective devices (SPD) for the power and sensor wire terminations. Ground the SPD with minimum 10AW insulated ground wire of high strand-count to the closest ground termination point.

f. Provide matching cable connector as required

g. Provide a detector with a minimum range of 6 feet to no less than 65 feet.

h. Provide automatic detector tuning with temperature compensation.

i. Provide a detector with user selectable sensitivity settings.

j. Provide a detector with a response time of 15 milliseconds or less.

k. Provide detector with an output in a dry form C contact set, rated a minimum of 0.25 A at 24 Volts dc.

l. Provide detector enclosure with an enclosure rating NEMA 4X or better.

m. Provide a detector that is capable of operating in a humidity range of 0 to 95 percent and a temperature range of -40 to +170 degrees F.

n. Provide a detector that is capable of operating from 120V/60Hz power, or be provided with appropriate power module/assembly and appurtenance, which are suitable for operation with 120V/60Hz.

2.15.2 Induction Loops

Induction loops may be used for vehicle presence detection, wrong-way detection. Induction loops must be capable of detecting passenger vehicles, motorcycles, and high bed trucks. Tests for all three types of vehicles are to be conducted on each installed loop during the Performance Verification Test. Provide a pair of inductive loops per barrier/lane whose outputs are used to prevent barriers raising and lowering when a vehicle has activated the loop. These safety loops are to be in a quadrapole configuration. Provide loops as required by Appendix A and as shown on the drawings. Active vehicle barriers that cross multiple lanes are to have loops that are still sized for each lane. Induction loops used for vehicle detection and not wrong-way or overspeed detection are to be quadrapole. Provide induction loops systemthat meet the following:

a. Tuning: automatic, with temperature compensation.

b. Loop input: to withstand minimum 2000V, both normal and common modes.

c. Loop Sensing frequency: minimum four user selectable frequencies to minimize cross talk with adjacent loops.

d. Sensitivity: user selectable, minimum 8 ranges, 20 to 2500 micro henries with a Q factor of minimum 5.

e. Diagnostic: provide diagnostics and related indication for short and open loop circuit.

f. Detector output: dry form C contact set, rated a minimum of 0.25 A at 24 Volts dc.

g. Operating humidity: 0 to 95 percent.

h. Operating temperature: -40 to 170 degrees F.

i. Vibration: NEMA TS-2 -2.1.9 or better.

j. Shock: NEMA TS-2 -2.1.10 or better.

k. User selectable operation modes: presence, pulse on entrance, pulse on exit - factory set on presence mode.

l. User selectable operation: Fail Safe.Fail Secure.

m. User selectable sensitivity boost feature, which boosts sensitivity after a presence detection and holds the increased sensitivity until the detection drops out, at which time sensor sensitivity returns to the original setting.

n. Power requirement: 120V/60Hz, or be provided with appropriate power module/assembly and appurtenance, which is suitable for operation with 120V/60Hz.

o. Loop Wire.

(1) Provide number of inductive loops as per manufacturer's recommendations based on loop size and distance between loop and loop amplifier.

(2) Ensure that the loop slots in which the loop wire is laid are free from debris, sharp objects, and are completely dry. Clean out slots with compressed air before installing loop wire.

(3) Install loop wire in layers. Install backer rods over top wire at a minimum of 1 foot spacing to ensure uniform placement of wire in the slot. Fill the loop slots with sealant per recommendation of the loop wire manufacturer.

(4) Use 16AW stranded cable with cross-linked-polyethylene insulation installed in a PVC sleeve. Loop wire extending from the loop to the loop amplifier is to be twisted with a minimum twist pitch of 6 per foot.

(5) Check conductor resistance to ground with "megger" of 500V or higher. Remove and replace the whole installation if ground resistance of less than 10 mega-Ohms is measured.

(6) Provide surge protective device for both loop-wire terminations at or near the loop detector module. Ground the SPD with minimum 10AW insulated ground wire of high strand-count to the closest ground termination point.

(7) Provide loops that are capable of detecting motorcycles, passenger vehicles, and high bed trucks with the same sensitivity setting.

(8) Provide two complete loops for wrong-way detection. Using a single loops to detect wrong-way is not acceptable.

2.15.3 Radar

Radar detection sensors may be used for vehicle wrong-way detection.. Provide radar detection units that meet the following requirements:

a. Provide a detector unit with an operating temperature range of -40 to +170 degrees F and a relative humidity range of 5 to 95 percent, non-condensing. Equip The detector unit with means for automatic temperature compensation as is necessary to overcome adverse effects of temperature and humidity swings in the specified range.

b. The detector unit must be resistant to vibration in accordance with NEMA TS-1, IEC 60068-2-30 (test Fc), or approved equivalent. The detector unit must be resistant to shock in accordance with NEMA TS-1, IEC 60068-2-27 (test Ea), or approved equivalent.

c. Provide a detector unit with a withstand voltage surge of minimum 1kV (rise time = 1.2 microsecond, hold = 50 microsecond) applied in

differential mode to all lines, power and output, as defined by IEC 61000-4-5 standard.

d. Provide a detector unit that does not emit a noise at levels exceeding 55 dBa when measured at a distance of 3 feet away from its surface.

e. Each detector unit is to transmit on a frequency band of 10.525 GHz +/-25 MHz or another approved spectral band. Provide a detector that complies with the limits for a Class A digital device pursuant to Part 15 of the FCC rules or the appropriate Spectrum Management Authority. Provide a detector unit that does not interfere with any known equipment. Ensure transmitter power does not exceed 10 mili-watts.

f. Provide a detector unit that can detect vehicle speed with 95 percent accuracy or greater independent of the vehicle's direction of travel through the detection zone.

g. Provide a detector unit with a field of view that covers an area defined by an oval shaped beam with a beam height and width of 15 degrees minimum and a range of 10 to 200 feet minimum.

h. Provide a NEMA 3R enclosure or better for the detector unit. Do not exceed overall nominal envelop dimensions of 8 by 10 by 6-inch.

i. Provide a detector unit with a power requirement of 120V/60Hz, or be provided with appropriate power module/assembly and appurtenance, which is suitable for operation with 120V/60Hz.

j. Provide the detector unit output upon detection of a vehicle speed over the adjustable preset value with a dry form C contact set, rated a minimum of 0.25 A at 24 Volts dc.

k. Provide a detector unit that has a blind zone of not more than 10 feet in front of the unit.

l. The detector unit may be applied in either Side-fired or Forward-looking configuration.

m. Detector units may be mounted on existing ACP/ECF structures or utility poles if suitable for this purpose. When existing structures and utility poles are not suitable, provide mounting trusses or poles for mounting detector units. Provide a support structure that deflect less than 0.5 inch at exposure to 100 mph winds with a gust factor of 1.3 when a detector unit or units is mounted on it.

n. Set all detector unit parameters and adjust detectors to provide required zone coverage.

2.15.4 Video Detection

Video detectors may be used for vehicle presence, and wrong-way detection. Detection is to be derived from video image signals received from a CCTV video camera. The video vehicle detector set includes the camera, hardware, software, and appurtenances required to perform the detection functions required on the drawings. The Video analytics system produced warning annunciation via alarm contacts when the required detection criteria are met. Refer to Section 28 10 05 ELECTRONIC SECURITY SYSTEMS

(ESS) for requirement on the related video camera and video signal transmission system. Provide video detectors that meet the requirements listed below.

a. Provide a detector unit with an operating temperature range of -40 to +170 degrees F and a relative humidity range of 5 to 95 percent, non-condensing.

b. Provide a detector that is resistant to vibration in accordance with NEMA TS-1, IEC 60068-2-30 (test Fc), or approved equivalent. Provide a detector unit that is resistant to shock in accordance with NEMA TS-1, IEC 60068-2-27 (test Ea), or approved equivalent.

c. Provide a NEMA 3R enclosure or better for the detector unit.

d. Provide a detector unit with a power requirement of 120V/60Hz, or be provided with appropriate power module/assembly and appurtenance, which is suitable for operation with 120V/60Hz. Provide the detector unit output upon detection of a vehicle speed over the adjustable preset value with a dry form C contact set, rated a minimum of 0.25 A at 24 Volts dc.

e. The detector unit may be applied in either Side-fired or Forward-looking configuration.

f. Detector units may be mounted on existing ACP/ECF structures or utility poles if suitable for this purpose. When existing structures and utility poles are not suitable, provide mounting trusses or poles for mounting detector units. Provide a support structure that deflect less than 0.5 inch at exposure to 100 mph winds with a gust factor of 1.3 when a detector unit or units is mounted on it.

2.16 WRONG-WAY WARNING ANNUNCIATOR

Provide a warning annunciator (audible and visual) as indicated in the following:

(1) Provide a visual and audible annunciator that produces a sound whenever a wrong way is detected by a vehicle entering from the exit. Provide the barrier control panels with an audible and visible indicating device as indicated in Appendix and on the drawings.

(2) Provide a visual and audible annunciator that produces a sound whenever a wrong way is detected by a vehicle entering from the exit. Provide a marquee style LED sign that shows "WRONG WAY" with an audible annunciator. Mount marquee on a column in the ID Check area that is visible to the guards when looking toward approaching traffic. Provide a means to adjust the volume on all the audible alarms. Provide an audible annunciator that sounds for 3 seconds and then clears itself.

2.17 NON-CRASH RATED ACTUATED TRAFFIC ARM ASSEMBLY

Provide actuated traffic arm capable of 300 duty cycles per hour as a

minimum and capable of operating the arm through 90 degrees. Provide gate operators with single phase 208 voltmotors. Provide slab size and anchorage for gate operator in accordance with manufacturer requirements.

(1) Cover each traffic arm with 16 inch wide reflectorized red and white sheeting. Provide the traffic arm with retroreflective markings, in accordance with MARKINGS, LIGHTING AND SIGNS paragraph of this SECTION.

(2) Furnish a spare traffic arm for each traffic arm.

(3) Construct gate operator cabinets of galvanized steel, or aluminum and paint per manufacturers approved standard color.

(4) Provide gates with a hand-crank, or other means, which will allow manual operation during power failures.

(5) Construct actuated traffic arms out of wood, steel, fiberglass, or aluminum, as specified by the manufacturer for the given lengths as shown on the drawings.

(6) Provide each gate operator with an obstruction detector that automatically reverses the gate motor when an obstruction is detected. Provide an obstruction detector that is one of the following: An induction loop buried in the road, a photocell electric eye mounted on the gate operator, or a safety strip mounted on the lower edge of the arm. The detector system automatically deactivates when the arm reaches the fully lowered position.

2.17.1 Traffic Arm at Other Areas

Provide non-crash rated actuated traffic arm (barrier gate arm) assembly with an opening and closing time of less than or equal to 3 seconds. Provide each entry lane with a vertical traffic arm gate. Each traffic arm is to be capable of being operated from a remote open-close push button station. The guard booth for that lane is to have the means to open and close. Provide a means to control each traffic arm from the Command and Control. Provide actuated traffic arms with three LED flashing lights mounted on the arm.

2.18 UNINTERRUPTIBLE POWER SUPPLIES (UPS)

UPS will be furnished under Division 26 - Electrical.

2.19 SURGE PROTECTION

2.19.1 Power Line Surge Protection

Protect equipment connected to alternating current circuits protected from power line surges. Equipment protection must withstand surge test waveforms described in IEEE C62.41.1 and IEEE C62.41.2. Fuses are not to be used for surge protection.

2.19.2 Sensor Device Wiring and Communication Circuit Surge Protection

Protect inputs against surges induced on device wiring. Protect outputs against surges induced on control and device wiring installed outdoors and as shown. Protect communications equipment against surges induced on any communications circuit. Install surge protection circuits at each end on cables and conductors, except fiber optics, which serve as communications circuits between systems. Furnish protection at equipment, and additional metal-oxide varistor (MOV) protectors rated for the application on each wireline circuit is to be installed within 3 feet of the building cable entrance. Fuses are not to be used for surge protection. Test the inputs and outputs in both normal mode and common mode.

a. If a 24VDC circuit, maximum continuous operation voltage is at least 33 VDC. Clamping voltage at 39 VDC. Maximum discharge current at 8/20 is 5000 amps.

2.20 INTRUSION DETECTION SYSTEM

Install and furnish the IDS and duress alarm system per the requirements of 28 10 05 ELECTRONIC SECURITY SYSTEMS (ESS).

The IDS and duress alarm system for the contract consists of providing power and pathways for the signal wiring. The IDS equipment is part of this contract as shown on the drawings.

2.21 CCTV SYSTEM

Install and furnish the CCTV system per the requirements of 28 10 05 ELECTRONIC SECURITY SYSTEMS (ESS).

2.21.1 CCTV System

The CCTV system for the contract consists of providing power and pathways for signal wiring. The CCTV system equipment is part of this contract.

2.21.2 AVBCS and ESS Interface

Provide the AVBCS with output contacts for use by the ESS (IDS and CCTV systems) as follows:

a. Pull up all camera views of the crash rated active vehicle barriers during any EFO activation. Provide a dry contact from the AVBCS to be used by the CCTV system.

b. Provide a dry contact from the AVBCS that indicates a tamper switch alarm. This contact is to be used by the IDS system.

c. Provide a spare dry contact from the AVBCS that indicates an EFO activation.

2.22 MATERIALS AND COMPONENTS

2.22.1 Materials and Equipment

Units of equipment that perform identical, specified functions are to be products of a single manufacturer. Provide all material and equipment that is new and currently in production.

2.22.2 Single Manufacturer Active Vehicle Barriers

Provide all parts, components, accessories fittings and fasteners by a single manufacturer as required by manufacturer's written requirements, installation instructions and written warranty, unless otherwise noted in this specification.

2.22.3 Field Enclosures

2.22.3.1 Interior Sensors

Provide sensors used in an interior environment with a housing that provides protection against dust, falling dirt, and dripping non-corrosive liquids.

2.22.3.2 Exterior Sensors

Provide sensors used in an exterior environment with a housing that provides protection against windblown dust, rain and splashing water, and hose directed water. Provide sensors that remain undamaged by the formation of ice on the enclosure.

2.22.3.3 Interior Electronics

Provide systems electronics used in an interior environment with enclosures which meet the requirements of NEMA 250, Type 12.

2.22.3.4 Exterior Electronics

Provide systems electronics used in an exterior environment with enclosures which meet the requirements of NEMA 250, Type 3R, 4, or 4X.

2.22.3.5 Corrosion Resistant

System electronics to be used in a corrosive environment as defined in NEMA 250 are to be housed in non-metallic non-corrosive enclosures which meet the requirements of NEMA 250, Type 4X.

2.22.4 Above Ground Components

All above ground metal components are to bepowder coated unless otherwise specified.

2.22.5 Below Ground Components

All below ground metal components are to bepowder coated unless otherwise specified.

2.22.6 Nameplates

2.22.6.1 Components

Provide a nameplate for major components of the system. Nameplates will not be required for devices smaller than 1 by 3 inch. Provide corrosion-resistant metal plates that have at least the following data legibly marked:

a. Manufacturer's name.

b. Manufacturer's address.

c. Type, Style or Model number.

d. Serial number.

e. Date of manufacture.

f. Catalog Number.

2.22.6.1.1 AVB Nameplate

Provide nameplate data that is permanently attached to each vehicle barrier. Provide corrosion-resistant metal plates that have at least the following data legibly marked:

a. Manufacturer's name.

b. Model number.

c. Serial number.

d. Date of manufacture.

e. Catalog Number.

2.22.7 Tamper Switches

Provide tamper switches on all equipment enclosures for the AVBCS to include all operating panels and provide on all manhole/handholes that contain spliced control wiring. Provide enclosures with doors larger than 24 inches with two tamper switches or more. Provide corrosion-resistant tamper switches, arranged to initiate an alarm signal when the door or cover is moved. The enclosure and the tamper switch must function together and not allow direct line of sight to any internal components before the switch activates. Tamper switches must be inaccessible until the switch is activated; have mounting hardware concealed so that the location of the switch cannot be observed from the exterior of the enclosure; be connected to circuits which are under electrical supervision at all times, irrespective of the protection mode in which the circuit is operating; must be spring-loaded and held in the closed position by the door or cover; and be wired so that the circuit is broken when the door or cover is disturbed. The crash rated active vehicle barrier control system is to monitor the tamper switches and provide an audible/visual alarm to the Master control panel. The AVBCS is to provide a single dry contact output that indicates a tamper alarm. The alarms are to be zoned at the master control panel in the following manner:

(1) AVBCS operating control panels.

(2) AVBCS cabinets that contain control equipment such as PLCs that are not covered under Zone 1.

(3) Manholes/handholes that contain spliced control wiring associated with the AVBCS. If there are spliced wiring, then provide a

visual alarm at the master control panel.

2.22.8 Locks and Key-Lock Switches

2.22.8.1 Locks

Provide locks on system enclosures for maintenance purposes. Provide UL Listed locks, round-key type with 3 dual, 1 mushroom, 3 plain pin tumblers or conventional key type lock having a combination of 5 cylinder pin and 5-point 3 position side bar. Stamp keys "U.S. GOVT. DO NOT DUP". Arrange locks so that the key can only be withdrawn when in the locked position. Key locks alike and furnish only 2 keys for all of these locks. Control these keys in accordance with the key control plan as specified in paragraph Key Control Plan.

2.22.8.2 Key-Lock-Operated Switches

Provide UL listed Key-lock-operated switches as required to be installed on system components , round-key type, with 3 dual, 1 mushroom, and 3 plain pin tumblers or conventional key type lock having a combination of 5 cylinder pin and 5-point 3 position side bar]. Stamp keys "U.S. GOVT. DO NOT DUP". Provide 2 or 3 position key -lock-operated switches , with the key removable in specified positions. Key all key-lock-operated switches differently and furnish only 2 keys for each key-lock-operated-switch. Keys must be removable in the positions described in these specifications or as shown on the drawings. Control keys in accordance with the key control plan as specified in paragraph Key Control Plan.

2.22.8.3 Construction Locks

Use a set of temporary locks during installation and construction. The final set of locks installed and delivered to the Government must not include any of the temporary locks.

2.22.9 System Components

Design system components for continuous operation. Provide electronic components that are solid state type, mounted on printed circuit boards conforming to UL 796. Printed circuit board connectors are to be plug-in, quick-disconnect type. Incorporate safety margins of not less than 25 percent with respect to dissipation ratings, maximum voltages, and current carrying capacity on power dissipating components. Provide control relays and similar switching devices that are solid state type or sealed electro-mechanical.

2.22.9.1 Modularity

Design equipment for increase of system capability by installation of modular components. Design system components to facilitate maintenance through replacement of modular subassemblies and parts.

2.22.9.2 Maintainability

Design components to be maintained using commercially available tools and equipment. Arrange and assemble components they are accessible to maintenance personnel. Insure there is no degradation in tamper protection, structural integrity, EMI/RFI attenuation, or line supervision

after maintenance when it is performed in accordance with manufacturer's instructions.

2.22.9.3 Interchangeability

Construct the system with off-the-shelf components which are physically, electrically and functionally interchangeable with equivalent components as complete items. Replacement of equivalent components must not require modification of either the new component or of other components with which the replacement items are used. Do not provide custom designed or one-of-a-kind items without explicit approval from the Contracting Officer. Ensure interchangeable components or modules do not require trial and error matching in order to meet integrated system requirements, system accuracy, or restore complete system functionality.

2.22.9.4 Product Safety

Conform system components to applicable rules and requirements of NFPA 70. Install system components with instruction plates including warnings and cautions describing physical safety and any special or important procedures to be followed in operating and servicing system equipment.

2.23 LINE SUPERVISION

Supervise all signal and Data Transmission System (DTS) lines. Provide a system that supervises the signal lines by monitoring the circuit for changes or disturbances in the signal and for conditions as described in UL 1076 for line security equipment. The system is to initiate an alarm in response to a current change of 10 percent or greater. The system also initiates an alarm in response to opening, closing, shorting, or grounding of the signal and DTS lines.

2.24 ELECTRICAL WORK

Submit detail drawings containing complete wiring and schematic diagrams, and any other details required to demonstrate that the system has been coordinated and will properly function as a unit. Provide motors, manual or automatic motor control equipment ,except where installed in motor control centers and protective or signal devices required for the operation specified herein in accordance with Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM. Provide all field wiring for induction loop detectors, communication lines, and power circuits with surge protection. Provide any wiring required for the operation specified herein, but not shown on the electrical plans, or specified herein, under this section in accordance with Sections 26 20 00 INTERIOR DISTRIBUTION SYSTEM 33 71 02 UNDERGROUND ELECTRICAL DISTRIBUTION.

2.25 WIRE AND CABLE

Provide all wire, cable, and conduit connecting all Contractor furnished and, where indicated on the drawings, Government furnished equipment. Provide wiring in accordance with NFPA 70. Provide wiring that is fiber optic or copper cable in accordance with the manufacturers' requirements. Copper signaling line circuits and initiating device circuit field wiring must be No. 18 AWG size conductors at a minimum. Ensure wire size is sufficient to prevent voltage drop problems. Circuits operating at 24 VDC must not operate at less than 21.6 volts. Circuits operating at any other voltage are to ensure the voltage drop does not exceed 5 percent of nominal

voltage.

2.25.1 Above Ground Sensor Wiring

Provide sensor wiring that is 20 AWG minimum, twisted and shielded, 2, 3, 4, or 6 pairs to match hardware. Provide multi-conductor wire with an outer jacket of PVC.

2.25.2 Cable Construction

Provide all cable components to withstand the environment in which the cable is installed for a minimum of 20 years.

2.26 DATA TRANSMISSION SYSTEM (DTS)

Provide DTS as specified in Section 27 10 00 BUILDING TELECOMMUNICATIONS CABLING SYSTEM.

2.27 CONCRETE

Provide concrete that conforms to Section 03 30 00 CAST-IN-PLACE CONCRETE.

2.28 WELDING

Welding is to be in accordance with AWS D1.1/D1.1M.

2.29 ACCESSORIES

Supply all accessories as required for a complete and finished system. Provide, at a minimum, all accessories as required by manufacturer's instructions.

2.30 FABRICATION

Shop assembly the vehicle barrier systems to the greatest extent possible.

2.31 TEST, INSPECTIONS AND VERIFICATIONS

Provide manufacturer written verification that vehicle barrier systems provided under this contract are manufactured in the "as-tested" and/or "as-certified" configurations, based on the crash testing.

Submit a Verification of Performance certificate stating that the construction, materials, and methods used will meet performance standards described in this section for this project

2.32 FACTORY ACCEPTANCE TEST

2.32.1 General

Provide personnel, equipment, instrumentation, and supplies necessary to perform a factory acceptance test of the complete crash rated active vehicle barrier control system. A factory acceptance test is to demonstrate that the proposed system and related equipment meet the control parameters within the contract documents. The test is to demonstrate how the systems operates if a PLC is damaged or if signals between systems are lost. The system must show that barriers cannot be deployed with anything

but a red signal. The test is to demonstrate the required alarm annunciation, CCTV controls, and sequence of events recording. The test set-up must include the PLC(s), the master control panel, alarm panel, control switches, and at least one of each type of remote panel, tamper switches, and limit switches. The duress, overspeed, and wrong-way sensors; the crash rated active vehicle barrier open and close position switches; the VPDs; the traffic signals; and the warning beacons may all be simulated.

A member of the Protective Design Center and of the Communities of Standardization for Access Control Points are to witness the factory acceptance test unless waived by the Government.

Upon Test Plan approval by the Contracting Officer, assemble the test system and perform the factory acceptance test. The factory acceptance test is to demonstrate that the subsystems comply with the requirement specified herein. Conduct the factory acceptance test during regular daytime working hours on weekdays. The Contracting Officer reserves the right to witness all or a portion of the factory acceptance test.

2.32.2 Factory Acceptance Test Plan

Submit Test Plan for the factory acceptance test plan, a minimum of 45 days before the scheduled start of all factory acceptance tests. Factory test plan includes a schedule, test procedures, equipment catalog cuts, one line diagrams showing interconnections of all subsystem components, and diagrams showing control logic for the barriers, traffic signals, warning beacons, and alarm and status points. See paragraph "TEST PLANS" for list of information required to be tested.

2.32.3 Factory Acceptance Test Report

Submit the factory acceptance test report, which documents the results of the test, no more than 1 week after the successful completion of the factory acceptance test. The test report is to include the results of all test procedures showing all commands, stimuli, and responses to demonstrate compliance with the contract requirements in the test report. Include the certification from technical specialists from the crash rated active vehicle barrier, PLC, and the CCTV subsystems that their subsystem meets the contract requirements in the test report. The Contracting Officer will notify the Contractor within ten (10) days of receipt of the test report whether the test report is approved. If disapproved, the Contracting Officer will note the specific procedures that are disapproved; retest those procedures. Do not ship equipment to the field until the test report is approved by the Contracting Officer.

PART 3 EXECUTION

3.1 EXAMINATION

After becoming familiar with all details of the work, verify that site conditions are in agreement with the contract drawings in accordance with paragraph "Current Site Conditions".

3.2 INSTALLATION

Perform installation in accordance with manufacturers instructions and in the presence of a representative of the manufacturer. Manufacturer's representative must be experienced in the installation, adjustment, and operation of the equipment provided. The representative is to be present

during adjustment and testing of the equipment. Show on the drawings proposed layout and anchorage of equipment and appurtenances, and equipment relationship to other parts of the work including foundation and clearances for maintenance and operation.

3.2.1 Oversight

The Contractor designated technical specialist for the crash rated active vehicle barrier control system (AVBCS) must oversee installation.

3.2.1.1 Observation and Inspection

Manufacturer's representative is to observe and inspect crash rated active vehicle barrier systems installation. Manufacturer's representative must be experienced in the installation, adjustment, and operation of the equipment provided. Manufacturer's representative is to be present during adjustment and testing of the equipment.

3.2.1.2 Installer Training/Certification

Install crash rated active vehicle barriers by the manufacturer's trained or certified installers in accordance with manufacturer's written installation instructions.

3.2.2 Installation Schedule

Before beginning any site work, provide a schedule of all installation and testing activities. Arrange project activities in the proposed schedule in chronological order. Coordinate all installation and testing activities, specifically those requiring ACP/ECF outages, with the Contracting Officer. There must be a Contracting Officer approved schedule before any site work is performed.

3.2.3 Crash Rated Active Vehicle Barrier Installation

Include with the detail installation drawings a copy of the as tested installation drawing. Install crash rated and/or certified crash rated active vehicle barrier in an 'as-tested' condition. Additional site investigation and construction is required in order to accomplish this; except when a site specific crash test was performed where the exact site requirements were utilized in the crash test.

3.2.3.1 Vertical Alignment

Install all vertical elements plumb and in alignment with a tolerance of 1/4 inch or in accordance with manufacturer's installation instructions, whichever is more restrictive.

3.2.3.2 Horizontal Alignment

Install all horizontal elements in the alignment indicated on the approved shop drawings with a tolerance of 1/2 inch in 6 feet - 6 inches or in accordance with manufacturer's installation instructions, whichever is more restrictive.

3.2.3.3 Field Welding

Field welding is unacceptable as it will cause significant damage to the galvanizing and powder coat protective finishes.

3.2.3.4 Field Cutting and Drilling

Avoid unnecessary cutting and drilling of pre-finished components. If necessary to cut or drill or otherwise modify product due to field conditions, repair factory finish in accordance with the manufacturer's written instructions.

3.2.4 Incidental Infrastructure

Provide all incidental construction as indicated. Design construct, and install incidental construction in accordance with local/state DOT requirements, AASHTO GDHS-7, AASHTO RSDG-4, NCHRP 350, and the MUTCD.

3.2.5 Concrete Placement

Provide concrete test reports per Section 03 30 00 CAST-IN-PLACE CONCRETE. After placement of the crash rated active vehicle barrier(s), replace the pavement sections to match the section and depth of the surrounding pavement unless a thicker pavement section is required for the tested condition of the crash rated active vehicle barrier. Warp pavement to match the elevations of existing pavement.

3.2.6 Reinforcing Steel Inspection

Inspect all by contractor's project manager manufacturer's representative and the Contracting Officer representative prior to concrete placement. Contractor is required to provide no less than10 days notice of concrete placement schedule to required inspection personnel. Coordinate with the requirements found in Section 03 30 00 CAST-IN-PLACE CONCRETE.

3.3 CYBERSECURITY INSTALLATION CERTIFICATION

Furnish a certification that control systems are designed and tested in accordance with DOD 8500.01, DOD 8510.01, 25 05 11 CYBERSECURITY OF FACILITY RELATED CONTROL SYSTEMS, and as required by individual Service Implementation Policy.

3.4 DRAINAGE

3.4.1 Pit Drainage

Provide a drain connection and oil/water separator in each barrier that requires pit/vault type construction. Provide a minimum drainage line of 3 inches.If there are multiple drain connections that can be made to the crash rated active vehicle barrier ensure the lines drain the low points as a minimum. Where drain lines connect to a common header drain, provide a minimum header drainage line of 6 inches. If the drainage line(s) are allowed to daylight into the side of a ditch, then provide a cast iron grate over the opening that is embedded into a concrete foundation. Provide coarse rock around the opening for at least 36 inches and extend down the slope to prevent erosion.

Submit sump pump data sheets and calculations showing adequacy of the pump for its proposed use.

3.4.2 Surface Drainage

Install crash rated active vehicle barrier per the test conditions for the crash rated active vehicle barrier. Ensure placement of the barrier provides positive drainage away from the barrier.

3.5 ELECTRICAL

Furnish and install all cables and conduits for all wiring interconnecting contractor furnished, and where indicated, Government furnished equipment. Install all wiring per Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM and Section 33 71 02 UNDERGROUND ELECTRICAL DISTRIBUTION. Provide arc-flash labeling per 26 05 73 POWER SYSTEM STUDIES.

3.5.1 Wiring

Use ring-style terminals for all control power wiring requiring compression terminals. Conform terminals and compression tools to UL 486A-486B. Use roundhead screws and lockwashers to provide vibration-resistant connections. Use screw connections or other locking means to prevent shock or vibration separation of the card from its chassis for connections between any printed circuit cards and the chassis. Ensure the electrical power supply breaker for the hydraulic power unit is capable of being locked in the power on and power off positions.

3.5.2 Grounding

Provide adequate grounding system for the following: Traffic signal supports, warning signal supports, AVBCS enclosure, crash rated active Vehicle Barrier frames, crash rated active vehicle barrier control enclosure, and supports for overspeed and wrong-way detectors. Test installed ground rods as specified in IEEE 142. Provide a #6 AWG ground wire from crash rated active vehicle barrier frame to the crash rated active vehicle barrier control enclosure.

3.5.3 Enclosure Penetrations

Penetrate enclosures through the bottom unless the system design requires penetrations from other directions. Seal penetrations of interior enclosures involving transitions of conduit from interior to exterior, and penetrations on exterior enclosures with rubber silicone sealant to preclude water entry. Terminate the conduit riser in a hot-dipped galvanized metal cable terminator. Fill the terminator with an approved sealant as recommended by the cable manufacturer and in a manner that does not damage the cable

3.5.4 Exterior Components

Those components installed outside are to be able to function within the environmental conditions indicated previously for the paragraph on Exterior Conditions.

Provide motors, actuators, wiring, luminaires, and other components that are installed below grade that are rated to function in a wet environment. Components within the barrier below grade fall in this category. Manufacturers of the crash rated active vehicle barrier and other below grade components are to assume a water saturated environment for the

components. The devices and components must be watertight per NFPA 70. Provide motors and actuators with a minimum rating ofIP67per NEMA MG 00001.

3.5.5 Other Requirements

Install the system in accordance with the standards for safety included in NFPA 70 and the appropriate installation instructions from the manufacturers of the equipment. Configure components within the system with appropriate service points to pinpoint system trouble in less than 30 minutes.

3.6 OPERATING AND MAINTENANCE INSTRUCTIONS

Submit written Operations and Maintenance Instructions.
As part of the Operations and Maintenance Instructions, provide:

a. Periodic inspection and testing recommendations for daily, weekly, monthly and yearly intervals.

b. Electronic copy of the control system programming for each AVB control system. Provide a legend for the acronyms used in the program as well a description of each major logic element.

3.7 REPAIR

Repair damage to galvanized, coated, painted finishes in accordance with manufacturers written instructions. Submit Manufacturer Repair of Coatings Instructions. In the case where the manufacturer does not have written instructions, Submit recommended repair instructions (referencing published standards) for approval.

3.8 TEST PLANS

Factory acceptance test plan is to cover items a through o and aa through hh or gg as appropriate as a minimum. The contractor verification test plan and performance verification test plan are to include at least all the following:

a. Information on the AVB to include size and rating.

b. Listing of the controllers and description of each controller and the locations of the controllers.

c. PLC restart test (test each one PLC individually) by turning off the PLC for at least 1 minute then back on to verify proper reboot of the system.

d. Battery power test. 10 minutes on battery then do an EFO and lower barrier.

e. Power on/off test.

f. Test (manual) test for each barrier.

g. Local test for each barrier.

h. Test and Local mode loop (VPD) operation. Test each loop at least once

with a motorcycle/utility vehicle, high bed vehicle, and passenger vehicle.

i. System alarms

j. Panel layout and labeling.

k. Matrix testing of the various combinations of modes that the AVBs can be found in.

l. Tests to verify loss of a PLC ensures safe operation of the system

m. Test traffic signal operation as well as wig-wag and in-ground light operation.

n. Verify loss of signal between controllers triggers a trouble alarm.

o. Other tests deemed necessary to ensure system operates safely.

p. Information on the layout of the barrier to include distance from ID Check.

q. Information on signage to include wording and location

r. Verification of grounding as discussed herein.

s. Information on the cabinet ratings and NEC disconnect locations.

t. Test or verification on any heating system associated with the AVBs

u. Verification that the AVB drains properly (may be a sump pump etc. that needs testing).

v. General appearance of the system to include paint stripe configuration on the barriers, use of reflective tape, etc.

w. Verification of safety equipment necessary for performing maintenance.

x. Verification that all tamper switches send an appropriate alarm to the master control panel.

y. EFO test for each EFO switch.

z. EFO loop (VPD) operation). Test each loop at least once with a motorcycle/small cart, SUV, and passenger vehicle.

aa. EFO loop activation when signal turns yellow

ab. EFO loop deactivation when signal turns yellow

ac. EFO Reset function works properly.

ad. Matrix testing of the various combination of loops for each safety mode: EFO, Test, Local. Note for Test and Local this does include both up (close) and down) open functions.

ae. Arm/Disarm (yes/no) selector switch operation for each remote EFO panel/station.

af. Other scenarios, not identified in the PVT plan, may be identified by commissioning team during the commissioning effort. In addition, timing of inductive loop activation within the parameters identified in the PVT may be varied by commissioning team. Unexpected AVB behavior is justification for failure whether or not the scenario is specifically identified in the PVT plan.

3.9 CONTRACTOR VERIFICATION TEST

Submit test plan for the Contractor Verification Test. Test plans are to include a a test schedule, a minimum of 45 days before the scheduled start of the Contractor Field Tests. See paragraph "TEST PLANS" for information required in a test plan. Calibrate and test all equipment, verify communications links between all subsystem components and between subsystems, place the integrated system in service, and test the integrated system using the approved test procedures for the contractor verification test. Submit the contractor verification test report no more than 1 week after the completion of each test. Deliver a report certifying that the installed complete system has been calibrated, tested, and is ready to begin performance verification testing. Include certifications from the Technical Specialists of the crash rated active vehicle barrier, PLC, and CCTV equipment/subsystems that the equipment/subsystems have been installed and tested and that they meet the requirements of the specifications in the report. If a change is made to the operating program during the contractor verification test for the crash rated active vehicle barrier system, then all completed testing up to that point must be done over in order to verify the change did not have a negative impact to the software operation.

3.10 FINAL SYSTEM ACCEPTANCE

3.10.1 General

Final system acceptance consists of successfully completing the Performance Verification Test and completion of the commissioning, the training of Installation security and maintenance personnel, and successfully completing an Endurance Test as described below.

3.10.2 Team Leader

Designate a team leader to be responsible for scheduling all tests, coordinating attendance of all required commissioning team members, conducting the tests, and preparing appropriate test reports and the final commissioning report.

3.10.3 Commissioning Team

The commissioning team consists of the commissioning team leader; the technical specialists from the crash rated active vehicle barrier supplier, and the programmer for the AVBCS;a representative of the USACE Protective Design Center; a contracting officer's representative; and a representative from the Installation.

3.10.4 Training

3.10.4.1 General Requirements

Conduct training courses for designated personnel in the operation and maintenance of the AVBCS. Orient the training to the specific system being installed. Deliver training manuals for each trainee with 2 additional copies delivered for archiving at the project site. Include an agenda, defined objectives for each lesson, and a detailed description of the subject matter for each lesson in the manuals. Furnish audio-visual equipment and other training materials and supplies. Where the Contractor presents portions of the course by audio-visual material, copies of the audio-visual material is to be delivered to the Government either as a part of the printed training manuals or on the same media as that used during the training sessions. A training day is defined as 8 hours of classroom instruction, including 60-minutes total of breaks and excluding lunchtime, Monday through Friday, during the daytime shift in effect at the training facility. For guidance in planning the operator training for the guards, assume that guards will have a high school education or equivalent and are familiar with ACPs/ECFs operations. For maintenance training, assume mechanical and electrical maintenance personnel typically employed at military installations. Obtain approval of the planned training schedule from the Government at least 30 days prior to the training. Do no provide training until the performance verification test has been successfully completed.

3.10.4.2 Guard's Training

Teach the guard training course at the project site for a period of up to eight hours after the performance verification test, but before commencing the endurance portion. Plan on a maximum of 12 personnel attending the course. Include instruction on the specific hardware configuration of the installed system and specific instructions for operating the installed system in the course. Upon completion of this course, each student is to demonstrate the ability to perform the following when operating the AVBCS:

a. Operate the crash rated active vehicle barriers in Test, Local and EFO/Auto modes.

b. Understand the differences between the normal and EFO/AUTO operation of the barriers.

c. Understand when to use Test, Local and EFO/AUTO modes for each barrier.

d. Understand all requirements for putting a barrier in either the Test or Local modes including required actions in the roadway ahead of the barrier and actions at the barrier.

e. Understand the crash rated active vehicle barrier safety scheme including operation of all vehicle presence detectors, traffic signals, signs, and warning signals.

f. Understand operation of the traffic signal including all signal indications for various operational modes and barrier positions.

g. Reconfigure barriers after an EFO/Auto activation/operation.

h. Monitor, acknowledge, and reset alarms.

i. Understand the operation and coverage of all wrong-way sensors.

j. Monitor and control CCTV system

3.10.4.3 Maintenance Personnel Training

The Maintenance Personnel Training Course is to be taught at the project site for a period of up to eight hours after the Performance Verification testing. Plan on a maximum of 4 personnel attending the course. Include the following in the course:

a. Instruction on each equipment and its configuration in the installed system.

b. Trouble shooting and diagnostic procedures.

c. Component repair and replacement procedures.

d. Emphasis on the importance of periodic testing and preventative maintenance. Provide a list of periodic preventative maintenance tasks for the crash rated active vehicle barriers and other critical equipment.

e. Calibration procedures.

f. Review of system drawings to identify device locations, communications, topology, and flow.

3.10.4.4 System Manager Training

Train System managers for a minimum of 4 hours in addition to the Guard and Maintenance Personnel described above. Provide system manager training training for trainers, such that, system managers will be able to train new guards and maintenance personnel in the future. Plan on a maximum of 4 personnel attending this training. System manager training is to include the following:

a. Enrollment/deactivation process including the assignment of operator passwords.

b. Change database configuration.

c. Modify graphics, if provided.

d. Print reports, e.g., Sequence of Events reports.

e. Any other functions necessary to manage the system.

3.10.5 Performance Verification Test (PVT)

3.10.5.1 Test Plan

Submit a performance verification test plan. The test plan is to match the test plan used for the Contractor Verification Test plus any changes that came up during the testing. The test plan is to include the test procedures/plan, layouts of each of the operating panels and a site layout showing the location of the crash rated active vehicle barriers, traffic

signals, warning beacons, actuated traffic arms, panels and all associated signs and signals. Submit to the contracting officer 30 days prior to the proposed start date of the performance verification test.

3.10.5.2 Test Equipment and Personnel

Provide the following for all PVT tests:

a. A minimum of 6 hand held radios/walkie-talkies with additional batteries.

b. Safety vests for all participants.

c. Two Stop watches.

d. Flash lights (if testing at night).

e. Multi-meter.

f. Metal of sufficient size and shape to activate vehicle presence detection (VPD) loops. Provide metal that is easily moveable and provide one piece of metal per loop. Metal roadway signs with a rope tied to one end works well.

g. SUV or High bed truck to test each VPD loop.

h. Sedan type car to test each VPD loop.

i. Motorcycle to test each VPD loop. If testing is during the fall/winter, then a small utility vehicle can be substituted.

j. Three copies of the PVT test plan.

k. Camera that can take video of the crash rated active vehicle barrier and traffic signal operation and then allows a person to go back and count frames to get actual "real time". This is more accurate than the stop watch.

l. Sufficient personnel during the matrix testing equivalent to the number of vehicle presence detection (VPD) loops plus three more. This number of personnel can include government representatives; however, it must be verified that they are willing and able to support the matrix testing. Testing that does not include matrix testing requires five personnel to include government personnel.

m. Contractor is to ensure that someone who can make corrections to the software is present.

3.10.5.3 Commissioning

Perform a performance verification test of the installed AVB Control System per approved test procedures and under the direction of the Contractor's Team Leader. The PVT is to demonstrate that the system complies with the requirements specified herein. Conduct the PVT, where possible, during regular daytime working hours on weekdays. At the completion of the PVT, appropriate Commissioning Team Members are to sign identifying what passed and any deficiencies left unresolved. If a change is made to the operating

program during the performance verification test for the crash rated active vehicle barrier system, then all completed testing up to that point must be done over in order to verify the change did not have a negative impact to the software operation.

3.10.5.4 Test Report

Within ten (10) days of successful completion of the PVT, the Contractor's Team Leader submits a performance verification test report to the Contracting Officer documenting the results of the test. Include in the test report the results of all test procedures showing all commands, stimuli, and responses to demonstrate compliance with the contract requirements. The Contracting Officer will notify the Contractor, within ten (10) days of receipt of the test report, whether the Test Report is approved. If disapproved, the Contracting Officer will note the specific procedures that are disapproved; retest those procedures. Do not start the Endurance Test until the PVT test report is approved by the Contracting Officer.

3.10.5.5 Opposite Season Test

Coordinate with the Commissioning Team to conduct an opposite season PVT. If the initial PVT test is performed in the winter, then the opposite season test is to be performed in the summer. If the initial PVT is done in the spring, summer, or fall, then the opposite season test it to be performed in the winter. All PVT tests and test reports submissions are required for the initial PVT are to be performed for the opposite season PVT.

3.10.6 Endurance Test

3.10.6.1 General

The Contractor's Commissioning Team Leader must submit a test plan including a schedule, test description, list of personnel required to conduct the test, and a list of all data to collect and observances to be made in order to demonstrate system reliability and operability of the completed AVB control system. Conduct the endurance test in phases as specified. The Contractor is to notify the Contracting Officer, in writing, that training as specified has been completed and that the correction of all outstanding deficiencies has been satisfactorily completed prior to performing the endurance test. The Contracting Officer may terminate the testing at any time the system fails to perform as specified. Upon termination of testing by the Contracting Officer or by the Contractor, commence an assessment period as described for Phase II below. Minimum operation times indicated in the O&M manual will indicate the minimum specific intervals the system is to be exercised. Ensure the exercise intervals meet or exceed the O&M requirements. It is important to note that if the endurance testing uncovers a problem that requires a programming change then the PVT is required to be performed again. Intent of the Endurance test:

Hybrid Beacon Safety Scheme. This system typically does not have the crash rated active vehicle barrier moving up/down on a regular basis. The system is to be tested both manually and by an EFO operation at least once every 24 hours or its equivalent as agreed upon by the Contracting Officer. Shift change times are a good time for this operation.

General Barrier Operation. The system is to be tested manually at least

once every 12 hours or its equivalent as agreed upon by the Contracting Officer. Shift change times are a good time for this operation.

3.10.6.2 Phase I Testing

Conduct the test 24 hours per day for 14 consecutive calendar days, including holidays, and the system is to operate as specified. Make no repairs during this phase of testing unless authorized by the Contracting Officer in writing.

3.10.6.3 Phase II Assessment

After the conclusion of Phase I, identify all failures, determine causes of all failures, repair all failures, and deliver a written report to the Contracting Officer. Explain in detail the nature of each failure, corrective action taken, results of tests performed, and recommend the point at which testing should be resumed in the report. After delivering the written report, convene a test review meeting at the jobsite to present the results and recommendations to the Contracting Officer. As a part of this test review meeting, demonstrate that all failures have been corrected by performing appropriate portions of the performance verification test. Based on the Contractor's report and the test review meeting, the Contracting Officer will determine the restart date, or may require that Phase I be repeated. If the original Phase I testing was completed without any failures the endurance test is deemed completed.

3.10.7 Final Report

Upon successful completion of the Endurance Test, the Contractor's Team Leader must prepare a Final Report documenting that the Contractor has successfully completed the PVT and Endurance Test and training. Include signatures of the Commissioning Team in the Commissioning Report.

3.10.8 Post Commissioning PVT

Perform a performance verification test 6 months after the system was commissioned. All PVT tests and test reports required for the initial PVT are to be performed for the post commissioning PVT.

3.10.9 APPENDICES

APPENDIX A - SDDCTEA Approved Safety Schemes

Appendix A1 - HYBRID BEACON Crash Rated Active Vehicle Barrier Safety Scheme - 7 Seconds

Hybrid Beacon Safety Scheme Features. Provide the following features for the Hybrid Beacon active vehicle barrier Safety Scheme:

1. General Layout Information

1.1 Active Vehicle Barriers in all inbound and outbound lanes. .

1.2 Hybrid Beacon. A three light hybrid beacon signal head over each inbound and outbound active barrier. Special location may require only posts i.e. no masts. Post mounted requires two posts with each having a traffic signal. Provide three head traffic signals with two Red signals adjacent horizontally and a Yellow centered below the two red beacons. Install the hybrid beacon signal at the centerline of the AVB. The beacons are to be Light Emitting Diode (LED) type. Mast arm will have a 'Barrier Signal' sign.

1.3 A 2 foot wide stop line placed 86 feet in front of the the active vehicle barrier and the traffic signal is 42 feet from the near edge of the stop line. Provide a 'Stop Here On Red' sign.

1.4 Double solid white lines between inbound lanes approaching the barriers to prohibit lane changes in front of the barriers.

1.5 Diagonal pavement striping. Provide white crosshatching pavement marking that covers the front and back VPDs.

1.6 Vehicle Presence Detectors (VPDs) located immediately before and immediately after each barrier. VPDs can be induction loops, video motion sensors, or other suitable technologies capable of sensing vehicle presence. Induction loops must be diagonal quadrapole loop. A loop crossing multiple lanes is not allowed. The VPD before the AVB starts 2 feet from the AVB and is 76 ft long and . The VPD after the AVB starts 2 feet from the AVB and is 6 ft by 6 ft long.

1.7 Warning Sign and Warning Beacons (wig-wags) (2 Beacons with alternating flashing yellow lights) located 45 feet in front of the barriers. Beacon lamps will be LED.

1.8 One Master Control Panel, one Guard Booth Control panel plus one Guard Booth EFO button at each Guard Booth, one Overwatch Position Control Panel, two Search Area EFO panel , and a Local Control Panel or panels at each barrier along with all control switches and indicating lights as shown on the Drawings. Locate the Master Control Panel in the Command and Control location for use by the ACP/ECF guards. Locate each Local Control Panel at or near its respective barrier power unit.

1.9 Red in-pavement lights. When required are to be located between the stop line and approach VPD.

1.10 Horn located at the crash-rated active vehicle barriers. Provide the horn with a means to adjust the volume.

1.11 Provide passive vehicle barrier between lanes as indicated.

1.12 LED blankout sign that indicates 'Do Not Enter' installed at the barrier. Two per direction of travel by placing one on each side of the roadway.

2 BARRIER OPERATING CONTROL PANELS.
Operating panel layouts are found in the contract drawings.

3 TRAFFIC SIGNAL AND BARRIER CONTROLS.

3.1. Hybrid Beacon. EFO MODE OF OPERATION.

3.1.1 EFO Operation. Under normal operations, all barriers' mode selector switches on the Master Control Panel will be in the EFO position with the key removed and with that key being accessible only by the lead ACP/ECF guard. With the barrier's mode selector switch in the EFO position, EFO is enabled for that direction of travel, but the Open and Close switches for that barrier on the Master Control Panel and the Open and Close switches on that barrier's Local Control Panel are disabled.

3.1.2 In the EFO mode of operation with the barrier open, the Traffic Signal is Dark. Upon activation of an EFO command from any armed EFO, delay barrier emergency closure by 2 seconds. Activate the wig-wag (warning beacons) as soon as EFO is pushed. During the 2 seconds, the hybrid beacons signals change from dark (off) to Solid Yellow for 2 seconds and then to Alternating flashing Red (alternate on/off in a wig-wag fashion). Activate the in-pavement lights (flashing) when the traffic signal turns red and stay red as long as the traffic signal light is red. After 2 seconds from EFO activation, energize the barrier's emergency close circuit to close the barrier(s) in emergency fast mode (2 seconds or less) provided that the VPDs immediately in front of and behind the barrier are clear (entry and exit loops). If either or both VPDs detect a vehicle, then the barrier does not close; however, the the emergency close signal is latched only for those barriers that were in EFO mode at the time of activation. Once both VPDs are clear, the barriers (those in EFO mode) deploy (unless EFO Reset had been activated). The warning horn sounds for 10 seconds with the setting adjustable in the program. In addition to any indicating lights required for EFO activation, the system is to be programmed to show steady on red indicating light at all EFOs to indicate an EFO activation; however, the EFO that was activated is to have a flashing indicating light.

3.2 Hybrid Beacon. EFO RESET. After an EFO activation, all EFO activated barriers cannot be operated until an EFO Reset is accomplished. The guards will close all inbound and outbound lanes. Guards will obtain the EFO Reset key and then activate the EFO Reset switch on the Master Control Panel to reset EFO. This turns off the warning beacons (wig-wags) and removes the latch command for the EFO circuit.This removes the latch command for the EFO circuit. The person in charge can then place the Master Control Panel mode switches into Test (or go through the sequence to use the Local panel) and use the Open buttons to lower each barrier. Once all the barriers are Open for a given direction of travel and the corresponding mode switches are back in EFO mode, then the traffic signal for that direction of travel turns Dark and the in-pavement lights deactivate. This needs to be done for both directions of travel in order to have Dark traffic signals in all directions.

3.3 Hybrid Beacon. TEST MODE OF OPERATION.

3.3.1 Test Operation. An individual barrier can be test operated by installing the proper lane closure markings and barricades ahead of the

active barrier and then placing the mode selector switch for that direction of travel into the Test position. With the mode selector switch in the Test position, the barrier's Open and Close switches on the Master Control Panel for that direction of travel are enabled, but the Open and Close switches on the Local Control Panel for that direction of travel are disabled. In addition all active EFO switches are disabled from operating any barrier for that direction of travel. Where a single barrier spans both inbound and outbound lanes, the test operation switch deactivates all EFO capability.

3.3.2 When a mode switch is placed in Test mode, the traffic signals for that direction of travel cycle to Alternating Flashing RED (the hybrid beacons signals change from dark (off) to Steady Yellow for 2 seconds and then to Alternate flashing Red (alternate on/off in a wig-wag fashion). The barriers for that direction of travel are allowed to operate without any time delay ONCE the signal is alternating flashing Red. The traffic signals for that direction of travel stay Red until all the conditions are met for RETURN TO EFO MODE. The in-pavement lights for that barrier activate when the traffic signal is red and stay red as long as the traffic signals are red. Note the warning beacons do not operate under Test or Local mode, but can be allowed to operate if requested and approved. WARNING: Installation is responsible for proper lane closure procedures (closing off the lane, bagging the traffic signal over the barrier if a long term operation, having guards present, etc) during a Test or Local mode operation.

3.4 HYBRID BEACON - LOCAL MODE OF OPERATION

3.4.1 Local Operation. Local mode is used when maintenance personnel need to perform maintenance on the barrier.

3.4.1.1 Maintenance personnel would obtain the mode selector switch key from the lead ACP/ECF guard and place the key into the Master Control Panel 3-position mode selector switch for the appropriate direction of travel.

3.4.1.2 The person then turns the selector switch to the Local position to enable Local mode and then removes the key.

3.4.1.3 With the mode selector switch on the Master Control Panel in the Local position, Open and Close switches on the Master Control Panel for the barriers for that direction of travel are disabled and all EFO switches are disabled for that direction of travel. If a single barrier spans multiple directions of travel all EFO capability will be deactivated.

3.4.1.4 The maintenance person would then insert the key into the appropriate Off-Local mode selector switch on the barrier's Local Control Panel and turn the key to the "Local" position. This action activates the Open and Close switches at the Local Control Panel for the barriers in that direction of travel.

3.4.1.5 Maintenance personnel would also have to block and mark the lane ahead of the barrier in accordance with standard lane closure procedures/standards and also lock and tag out certain equipment at the barrier per the barrier manufacturer's recommendations for the type of maintenance to be performed.

3.4.2 Hybrid Beacon. LOCAL MODE OF OPERATION (one barrier per direction of travel). When a mode switch is placed in Local mode, the traffic signals for that direction of travel cycle to Alternating Flashing RED (the hybrid beacons signals change from dark (off) to Steady Yellow for 2 seconds and

then to Alternate flashing Red (alternate on/off in a wig-wag fashion). The barriers for that direction of travel are allowed to operate without any time delay ONCE the signal is alternating flashing Red and there is full Local control. The traffic signals for that direction of travel stay Red until all the conditions are met for RETURN TO EFO MODE. The in-pavement lights for that barrier activate when the traffic signal is red and stay red as long as the traffic signals are red. Note the warning beacons do not operate under Local, but can be allowed to operate if requested and approved. WARNING: Installation is responsible for proper lane closure procedures (closing off the lane, bagging the traffic signal over the barrier if a long term operation, having guards present, etc) during a Test or Local mode operation.

3.5 If the Master Control panel is in EFO mode and the Local Panel is in Local mode, that is a conflict. Hybrid beacon is dark and EFO DOES NOT function.Traffic signal is green and EFO DOES NOT function.Local panel does not have any control. The mode indicating lights for Local and EFO are to alternate flashing and an audible alarm is to sound.

3.6 If the Master Control panel is in Test mode and the Local Panel is in Local mode, that is a conflict. Hybrid beacon signal is Red after cycling and all corresponding Test mode functions are INACTIVE.Traffic signal is Red after cycling and all corresponding Test mode functions are INACTIVE. Local panel does not have any control. The mode indicating lights for Test and Local are to alternate flashing and an audible alarm is to sound.

3.7 Out-of-Service switch. This function is provided for times when a barrier is damaged in a lane and needs to be taken out of service for an extended period of time. The out of service switch is to be located at the AVB location and is allowed to operate in EFO, Test and Local modes. This allows an AVB to be locked out in a lane, but the other lane can operate under EFO. The switch locks out all functions for the AVB when activated. The up and down lights for that AVB will alternate going on and off. WARNING: Installation is responsible for proper lane closure procedures (closing off the lane, bagging the traffic signal over the barrier, having guards present, etc). The Out-Of-Service switch has two positions: Yes and No .

3.7.1 No Position. All controls operate normally.

3.7.2 Yes Position. The Close/ Open position indicating lights for those barriers will alternate from one to the other approximately every 1 sec. This will happen at the Master Control Panel, Local Control Panel (if on) and at any other panel that has barrier position indicator lights.

3.7.2.1 If Local Panel is in Local Mode, then traffic signal is red and in-pavement lights are on. All controls to operate the particular barrier(s) are locked out.

3.7.2.2 If system is in Test Mode, then traffic signal is red and in-pavement lights are on. All controls to operate the particular barrier(s) are locked out.

3.7.2.2 If system is in EFO Mode, then traffic signal is dark. All controls to operate the particular barrier(s) are locked out.

3.8 Hybrid Beacon. RETURN TO EFO MODE. When the mode switch is placed in the EFO mode and all the barriers for that direction of travel are Open (not deployed), then the barrier's Traffic Signal change from Red to Dark. If a mode switch is placed in the EFO mode and any of the barriers for that direction of travel are Closed, then the barrier's Traffic Signal stays Red and an alarm is generated on the ACP/ECF TROUBLE window on the Gatehouse Control Panel. The in-pavement lights turn off when the traffic signal changes to Dark.

3.9 Vehicle Presence Detector consisting of safety loops on either side of a crash rated active vehicle barrier may require additional programming and hardware. If the loops are more than 3 meters10 feet apart, then add 0.5-1 sec additional time delay on the "back" loop. The alternative is to provide a latching logic between loops. In the latching logic, the master panel needs a release pushbutton for each barrier.

3.10 AUDIBLE ALARMS. Provide an audible alarm at the Master Control Panel, Overwatch Control Panel, main Guard Booth Control Panel and Search Area Control panel(s). The volume must be adjustable either through a rheostat or other means. Provide a button that silences the audible alarm at each panel. This silence button does not affect the corresponding visual indicator. Silence button does not prevent an audible alarm if a new condition develops.

3.10.1 When an EFO is pushed an alarm will go off.

3.10.2 Overspeed and Wrong-way will each cause an alarm to go off for 3 seconds and then clear itself.

3.10.3 Duress activation.

3.10.4 AVB Trouble condition. Alarm happens where there is monitored problem detected that relates to the AVB. Red visual indicator for each electric power unit.

3.10.5 VPD Trouble condition. Alarm happens when there is something wrong with the loop controller or the loops monitored by that controller. Red visual indicator for each loop controller.

3.10.6 VPD Activation for over the set amount of time period (typically 15 seconds) Light goes on immediately for VPD activation, but audible alarm activates after 15 seconds.

3.10.7 Out of Service activation. When a barrier is initially placed in out-of-service, sound an audible alarm for 3 seconds. Open and Close indicator lights are to alternate on/off.

3.10.8 Master Panel in EFO mode and Local Panel is in Local Mode. EFO mode and Local mode indicator lights alternate being on.

3.10.9 Master Panel in Test mode and Local Panel is in Local Mode. Test mode and Local mode indicator lights alternate being on.

3.10.10 Return to EFO mode with an AVB or AVBs in the incorrect position (not fully open). EFO mode indicator light and open/down AVB position light(s) flash.

3.10.11 Communication Loss alarm. If a programmable logic controller loses communication with another programmable logic controller there will be an audible alarm. Red visual indicator.

3.10.12 Tamper switches - Control Panels. Tamper switches located inside each control panel cause an alarm when the cover is opened. Red visual indicator.

3.10.13 Tamper switches - Cabinets. Tamper switches located inside each cabinet cause an alarm when the cover is opened. Red visual indicator.

3.11 LED Blank-Out Sign. The sign is to conform to MUTCD or local Host Nation requirements.

3.12 AUDIBLE ALARMS. Provide an audible alarm at the Local Control Panel. The volume must be adjustable either through a rheostat or other means. Provide a button that silences the audible alarm at each panel. This silence button does not affect the corresponding visual indicator. Silence button does not prevent an audible alarm if a new condition develops. The alarm does not operate if the panel is not in Local mode.

3.12.1. AVB Trouble condition.

3.13 AUXILIARY CONTACTS
Provide auxiliary contacts (dry) to be used by the Intrusion Detection System and the CCTV system as specified herein and indicated on the drawings.

3.14 WARNING BEACONS (wig-wags). Warning beacons are on anytime the barrier position receives a command to start the close process. The warning beacons do not go off until the traffic signal is Green.

APPENDIX B			
Events and Alarms at ACP/ECF, CSMS, & Recorded			
Event/Alarm Point	Alarm at Command & Control	Alarm at CSMS	Record on SER
On Generator Power (Note 8)	Yes	No	No
Generator Low Fuel (Note 8)	Yes	No	No
UPS Trouble Alarm (Note 9)	Yes	No	No
Hydrogen Gas Alarm (Note 10)	Yes	No	No
Barrier #N Inbound - EFO Mode (Note 4)	No	No	Yes
Barrier #N Inbound - TEST Mode	No	No	Yes
Barrier #N Inbound -LOCAL Mode	No	No	Yes
Barrier #N Inbound - AUTO Mode (Note 12)	No	No	Yes
Barrier #N Outbound - EFO Mode (Note 4)	No	No	Yes
Barrier #X Outbound - TEST Mode	No	No	Yes
Barrier #X Outbound - LOCAL Mode	No	No	Yes
Barrier #X Outbound - AUTO Mode (Note 12)	No	No	Yes
Barrier #N Inbound AVB - Manual Close Command	No	No	Yes
Barrier #N Inbound AVB - Manual Open Command	No	No	Yes
Barrier #N Inbound Traffic Arm - Manual Close Command (Note 3)	No	No	Yes
Barrier #N Inbound Traffic Arm - Manual Open Command (Note 3)	No	No	Yes
Barrier #X Outbound AVB - Manual Close Command	No	No	Yes
Barrier #X Outbound AVB - Manual Open Command	No	No	Yes
Barrier #X Outbound Traffic Arm - Manual Close Command (Note 3)	No	No	Yes
Barrier #X Outbound Traffic Arm - Manual Open Command (Note 3)	No	No	Yes
EFO Activation - Master Panel	Yes	No	Yes
EFO Activation - Pedestrian Booth	Yes	No	Yes
EFO Activation - Guard Booth #Y	Yes	No	Yes
EFO Activation - Search Area	Yes	No	Yes
EFO Activation - Overwatch	Yes	No	Yes
EFO Activation - Any Location (Note 11)	No	Yes	No
Barrier #N Inbound AVB Close Circuit Energized	No	No	Yes
Barrier #X Outbound AVB Close Circuit Energized	No	No	Yes
Barrier #N Inbound AVB - Trouble Alarm	Yes	No	Yes
Barrier #X Outbound AVB - Trouble Alarm	Yes	No	No
Barrier #N Inbound AVB - Safety Loop Trouble	Yes	No	No
Barrier #X Outbound AVB - Safety Loop Trouble			

APPENDIX B			
Events and Alarms at ACP/ECF, CSMS, & Recorded			
Event/Alarm Point	Alarm at Command & Control	Alarm at CSMS	Record on SER
Barrier #N Inbound AVB - Loop 1 (stop line) Malfunction (Note 13)	No	No	Yes
Barrier #N Inbound AVB - Safety Loop 2 (threat side) Malfunction	No	No	Yes
Barrier #N Inbound AVB - Safety Loop 3 (secure side) Malfunction	No	No	Yes
Barrier #X Outbound AVB - Loop 1 (stop line) Malfunction (Note 13)	No	No	Yes
Barrier #X Outbound AVB - Safety Loop 2 (threat side) Malfunction	No	No	Yes
Barrier #X Outbound AVB - Safety Loop 3 (secure side) Malfunction	No	No	Yes
EFO Reset	No	No	Yes
Barrier #N Inbound AVB - Loop 1 (stop line) Activation (Note 13)	No	No	Yes
Barrier #N Inbound AVB - Safety Loop 2 (threat side) Activation	No	No	Yes
Barrier #N Inbound AVB - Safety Loop 3 (secure side) Activation	No	No	Yes
Barrier #X Outbound AVB - Loop 1 (stop line) Activation (Note 3)	No	No	Yes
Barrier #X Outbound AVB - Safety Loop 2 (threat side) Activation	No	No	Yes
Barrier #X Outbound AVB - Safety Loop 3 (secure side) Activation	No	No	Yes
	No	No	Yes
Barrier #N Inbound AVB - Loop 1 (stop line) Deactivation (Note 13)	No	No	Yes
Barrier #N Inbound AVB - Safety Loop 2 (threat side) Deactivation	No	No	Yes
Barrier #N Inbound AVB - Safety Loop 3 (secure side) Deactivation	No	No	Yes
		No	Yes
Barrier #X Outbound AVB - Loop 1 (stop line) Deactivation (Note 3)	No	No	Yes
Barrier #X Outbound AVB - Safety Loop 2 (threat side) Deactivation	No	No	Yes
Barrier #X Outbound AVB - Safety Loop 3 (secure side) Deactivation	No	No	Yes

APPENDIX B			
Events and Alarms at ACP/ECF, CSMS, & Recorded			
Event/Alarm Point	Alarm at Command & Control	Alarm at CSMS	Record on SER
Barrier #N Inbound AVB Close Limit Switch Activated	No	No	Yes
Barrier #X Outbound AVB Close Limit Switch Activated	No	No	Yes
Barrier #N Inbound AVB Open Limit Switch	No	No	Yes
Barrier #X Outbound AVB Open Limit Switch Activated	No	No	Yes
Master Panel Power Off	No	No	Yes
Local Panel Power Off	No	No	Yes
EFO Not Armed - Guard Booth #Y	No	No	Yes
EFO Not Armed - Overwatch	No	No	Yes
EFO Not Armed - Search Area	No	No	Yes
Overspeed Activated (Alarm)	Yes	No	Yes
Wrong-way Activated (Alarm)	Yes	No	Yes
Inbound Traffic Signal Red On	No	No	Yes
Inbound Traffic Signal Yellow On (Note 14)	No	No	Yes
Inbound Traffic Signal Green On (Note 15)	No	No	Yes
Outbound Traffic Signal Red On	No	No	Yes
Outbound Traffic Signal Yellow On (Note 14)	No	No	Yes
Outbound Traffic Signal Green On (Note 15)	No	No	Yes
Duress Activation - Any Location (Note 11)	Yes	No	No
Duress Activation - Guard Booth #Y (Note 11)	No	No	Yes
Duress Activation - Overwatch (Note 11)	No	Yes	No
Duress Activation - Command & Control (Note 11)	No	Yes	No
Duress Activation - Search Area (Note 11)	No	Yes	No
Duress Activation - Visitor Control Center (Note 11)	No	Yes	No
Intrusion Detection Activation - Guard Booth #Y (Note 11)	No	Yes	No
Intrusion Detection Activation - Overwatch (Note 11)	No	Yes	No
Intrusion Detection Activation - Command & Control (Note 11)	No	Yes	No
Intrusion Detection Activation - Search Area (Note 11)	No	Yes	No
Intrusion Detection Activation - Visitor Control Center (Note 11)	No	Yes	No
Intrusion Detection Activation - Any Location (Note 11)	Yes	No	No

NOTES:

1. CSMS - Central Security Monitoring Station
2. SER - Sequence of Events Recorder
3. Monitor on Hybrid Beacon, if used, HEPD, and Stop Control Safety Schemes
4. This command is for any safety scheme that has an EFO.
5. N = number of inbound crash rated active vehicle barriers.
6. X = number of outbound crash rated active vehicle barriers
7. Y = number of guard booths
8. Alarm can be by a Remote Generator Alarm/Status Panel.
9. Alarm can be by a Remote UPS Alarm/Status Panel.
10. Alarm can be separate from Master Control Panel.
11. Alarm is to be monitored by the Intrusion Detection System Panel. Alarm signal is sent by the IDS panel.
12. Only used on Full Containment (Platooning/Sally Port) Safety Scheme. Number is number of lanes.
13. HEPD and Full Containment.
14. Hybrid Beacon, HEPD and Full Containment.
15. HEPD and Full Containment.

-- End of Section --

APPENDIX H
PINE BLUFF ARSENAL ACP STUDY

Submitted to:

Pine Bluff Arsenal, AR

Access Control Point Study

Prepared under contract by:

Military Surface Deployment and Distribution Command
Transportation Engineering Agency

In assistance with:

Gannett Fleming

*Excellence Delivered **As Promised***

August 2018

PINE BLUFF ARSENAL, ARKANSAS

ACCESS CONTROL POINT STUDY

Final Submittal

August 2018

Prepared for

Pine Bluff Arsenal, Arkansas

Prepared under contract by

Military Surface Deployment and Distribution Command
Transportation Engineering Agency

In assistance with

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TABLE OF CONTENTS

1. EXECUTIVE SUMMARY 1-1
1.1. Overview 1-1
1.2. Table of Improvement Options 1-2
1.3. Military Traffic Engineering Standards 1-8
1.4. Contact Information 1-9
1.5. SDDCTEA Resources and Services 1-9
2. INTRODUCTION 2-1
2.1. Installation Background and Location 2-1
2.2. Study Purpose and Goals 2-2
2.3. Study Schedule 2-2
2.4. Study Stakeholders 2-3
2.5. Resources and References 2-4
2.6. Stakeholder Supplied Data 2-5
3. GUIDANCE 3-1
3.1. Roadside Safety Overview 3-1
3.2. Signing Overview 3-7
3.3. Pavement Marking Overview 3-16
3.4. Pedestrian Accommodations Overview 3-21
3.5. ACP Design Criteria 3-40
3.6. Design Element Considerations 3-42
4. DATA COLLECTION 4-1
4.1. Existing ACP Volumes and Queues 4-4
4.2. Existing Roadway Volumes 4-7
5. TRANSPORTATION PLANNING CONSIDERATIONS 5-1
5.1. Future Traffic Considerations 5-1
6. INTERSECTION ANALYSIS 6-1
6.1. Common Deficiencies 6-2
6.2. Intersection Existing Conditions and Deficiencies 6-4
6.3. Intersection Operations Analysis 6-28

7. ACCESS CONTROL POINT ANALYSIS.....7-1

7.1. Existing Conditions 7-1

7.2. Lane Requirements 7-36

7.3. Commercial Vehicle Holding Requirements 7-37

7.4. Lane Calculations..... 7-38

7.5. Existing and Future ACP Recommendations 7-39

7.6. Interim-term Gate Concepts 7-42

8. SUMMARY OF IMPROVEMENT OPTIONS 8-1

8.1. Short-term Recommendations 8-2

8.2. Interim-term Recommendations 8-7

List of Appendices:

Appendix A – Traffic Data
Appendix B – Synchro Analyses
Appendix C – SMART Evaluator Results
Appendix D – AVB Placement Calculations
Appendix E – Cost Estimates
Appendix F – CADD Files
Appendix G – Project Correspondence
Appendix H – SDDCTEA Publications

NOTE: This study was developed utilizing common engineering and military resources and with information provided by the installation. Engineering judgment was applied where appropriate. Future conditions may vary from those predicted in this study. Safety and operational deficiencies may arise that were not identified and addressed by this study due to the nature of the study.

All concepts should be validated and adjusted as appropriate as part of the design process. Due to periodic changes to regulations, procedures, design guides, and policies, the potential solutions and concepts contained herein may be subject to revision.

LIST OF ACRONYMS AND ABBREVIATIONS

AASHTO	American Association of State Highway and Transportation Officials
ABA	Architectural Barriers Act
ACC	Air Combat Command
ACP	Access Control Points
ADA	Americans with Disabilities Act
ADT	Average Daily Traffic
AFMAN	Air Force Manual
AIE	Automated Installation Entry
AKO	Army Knowledge Online
AR	Army Regulation
AS	Army Standards
ASTM	American Society for Testing and Materials
AVB	Active Vehicle Barrier
BMTE	Better Military Traffic Engineering
BRAC	Base Realignment and Closure
CAD	Computer Aided Design
CADD	Computer-Aided Design & Drafting
CEE/EA	Categorical Exclusion Evaluation/ Environmental Assessment
COE	Corps of Engineers
CONUS	Continental United States
CrashLES	Crash Location Enhancement Studies
DoD	Department of Defense
DLAR	Defense Logistics Agency Regulation
DWS	Detectable Warning Surface
ECF	Entry Control Facility
ECMS	Engineering and Construction Management System
EGP	Engineering Grade Prismatic
ESRI	Environmental Systems Research Institute
FHWA	Federal Highway Administration
GIS	Geographical Information System
GPS	Global Positioning System
HCS	Highway Capacity Software
HQ	Headquarters
ID	Identification
IESNA	Illuminating Engineering Society of North America
ITE	Institute of Transportation Engineers
ISO	International Standards Organization
ITS	Intelligent Transportation Systems

LOS	Level-of-Service
MCO	Marine Corps Order
MUTCD	Manual on Uniform Traffic Control Devices
NAVFACINST	Naval Facilities Command Instruction
NCHRP	National Cooperative Highway Research Program
NTP	Notice-to-Proceed
OATSS	Operation Audit for Traffic Signal Sustainability
OCONUS	Outside the Continental United States
OPMG	Office of Provost Marshal General
OPNAVINST	Chief of Naval Operations Instructions
PDC/COS	Protective Design Center/Center of Standardization
PEP	Project Execution Plan
POC	Point of Contact
POV	Privately Owned Vehicle
PWS	Project Work Statement
QA/QC	Quality Assurance/Quality Control
RSA	Road Safety Assessment
SDDCTEA	Surface Deployment and Distribution Command Transportation Engineering Agency
SMART	Security, Manpower, Automation, Roads and Lanes, Traffic and Safety
SMS	Sign Management System
SOP	Standard Operating Procedures
TAC	Transportation Advisory Committee
TCMS	Traffic Control Management Systems
TMC	Turning Movement Counts
UFC	Uniform Facilities Criteria
USDOT	United States Department of Transportation
VCC	Visitor Control Center

1. EXECUTIVE SUMMARY

1.1. Overview

The Military Surface Deployment and Distribution Command, Transportation Engineering Agency (SDDCTEA), through Gannett Fleming, conducted an Access Control Point Study at Pine Bluff Arsenal, Arkansas. Existing conditions were evaluated and proposed improvements were made using transportation engineering and safety standards as documented in Section 2.5 of this report. This report provides short-term improvements to address existing deficiencies and interim and long-term conceptual designs to address future growth, capacity issues and noncompliance with the standards.

This study is consistent with executive directives to better consider sustainability and provide short-term and long-term actions with specific focus on minimizing costs while maximizing anticipated security, safety, and traffic benefits.

An overview of the study and its related sections are provided below:

1. **Executive Summary** – Summarizes key findings and improvement options.
2. **Introduction** – Discusses study area, purpose of the study, and project description.
3. **Guidance** – Provides general guidance and discusses roadway safety, a signing and pavement marking overview, pedestrian accommodations, and ACP design criteria and considerations.
4. **Data Collection** — Provides an overview of the existing volumes at each study intersection and ACP, the intersection lane configurations and traffic control.
5. **Transportation Planning Considerations** – Discusses all factors influencing future traffic volumes and provides a summary of future traffic demand at the study intersections and ACPs.
6. **Intersection Analysis** – Discusses existing conditions and deficiencies at the study intersections, operations analysis performed using Synchro software, and all short-term and long-term improvements.
7. **Access Control Point Analysis** – Discusses existing conditions and deficiencies at the study ACPs, required lane calculations, manpower requirements, operations analysis, and all short-term and long-term improvements.
8. **Summary of Improvement Options** – Provides order of magnitude cost estimates of improvement options presented throughout the report.

1.2. Table of Improvement Options

Location	Improvement	Report Section	Estimated Cost (2018 Dollars)
Common Deficiencies	▪ Replace all fixed posts with posts that utilize a breakaway design ▪ Replace all signs with Type I sheeting or any signs with poor retroreflectivity with signs that use type III sheeting or better	6.1	Fixed posts: $110/post Type III sheeting: $22/SF
Hoadley Road and Dollarway Road (Plainview Gate External)	▪ Mount the YIELD and DO NOT ENTER signs on their own separate breakaway posts ▪ Replace the KEEP RIGHT sign at the westbound approach with a R4-7 sign for consistency ▪ Mount each KEEP RIGHT sign on their own breakaway posts and them on the nose of the median in the direction in which vehicles are traveling ▪ Remove the curb cuts on the southern leg ▪ Install a concrete channelizing island at the northwest corner of the intersection. Stripe the area around the channelizing islands. ▪ Remove the YIELD sign on the eastbound approach ▪ Install lane use control signage on the signal mast arms and in advance of the intersection for the northbound and southbound approaches ▪ Restripe the faded pavement markings throughout the intersection ▪ Stripe a stop bar for each approach lane ▪ Slightly modify the turn radii and remove the median islands at the eastbound and westbound approaches	6.2.1	Signing Improvements: $5,000 Pavement marking upgrades: $8,500 Remove curb cuts: $700 Modify the turn radii: $66,000 Install concrete island: $1,800
Hoadley Road and Sibert Road (Plainview Gate Internal)	▪ Relocate the WELCOME sign that supplements the eastbound approach stop sign ▪ Replace the TRUCK ROUTE sign with a new Type III sheeting TRUCK ROUTE sign that is 24”x18” and is mounted to a height of 5 feet ▪ Replace the wayfinding sign with multiple wayfinding signs that have a maximum of three destinations and are up to date ▪ Restripe the broken and faded arrow marking ▪ Slightly modify the turn radii to accommodate commercial vehicles	6.2.2	Signing Improvements: $2,900 Pavement marking upgrades: $400 Modify the turn radii: $50,000

Location	Improvement	Report Section	Estimated Cost (2018 Dollars)
Wise Road and Dollarway Road (Dexter Gate External)	▪ Backfill the shoulder area at the northbound approach ▪ Remove the stop sign on the left-hand side of the roadway at the westbound approach ▪ Modify the turn radii to accommodate commercial vehicles ▪ Install compliant lane use arrow markings and a stop line at the westbound approach	6.2.3	Signing Improvements: $1,300 Pavement marking upgrades: $800 Backfill the shoulder: $500 Modify the turn radii: $22,000
Wise Road and Atkisson Road (Dexter Gate Internal)	▪ Delineate the swing gate with retroreflective, alternating, vertical red/white stripes and delineate the post since it is within the clear zone ▪ Install a ROAD CLOSED sign mounted on the swing gate ▪ Backfill the shoulder area for vehicles making a right turn from Atkisson Road ▪ Modify the turn radii to accommodate commercial vehicles	6.2.4	Signing Improvements: $1,900 Backfill the shoulder: $1,500 Modify the turn radii: $40,000
Stark Gate Road and Dollarway Road (Stark Gate External)	▪ Remove the old post that contains no signing ▪ Backfill the shoulder to create a smooth transition from the shoulder to the driveway ▪ Stripe a double-yellow centerline	6.2.5	Signing Improvements: $100 Pavement marking upgrades: $800 Backfill the shoulder: $100
Romer Road and Hanlon Road (Stark Gate Internal)	▪ Replace the stop sign with one that uses Type III sheeting or better and is mounted to a height of at least 5 feet ▪ Optional - Relocate the light pole (optional) ▪ Install an OM3-R object marker	6.2.6	Signing Improvements: $500 Relocate the light pole: $5,000 (optional)

Location	Improvement	Report Section	Estimated Cost (2018 Dollars)
Plainview Gate	▪ Install a CHECKPOINT sign supplemented by an AHEAD plaque in the approach zone ▪ Replace the Visitor's sign with a new Visitor's sign that uses white lettering on a green or brown background ▪ If the barriers do remain, signs and delineation should be installed per SDDCTEA Pamphlet 55-15, Exhibit 7.13 ▪ Optional - Remove the Czech hedgehogs and planters and to ensure that the fencing and swing gates are reinforced ▪ Refer to SDDCTEA Pamphlet 55-15 Chapter 7 for details on compliant chicanes ▪ Remove the traffic cones (optional) ▪ If the cones must remain, utilize compliant traffic cones according to MUTCD standards ▪ Install gate closure signage ▪ Install a supplemental PROCEED ONLY WHEN DIRECTED BY GUARD plaque for the STOP sign ▪ Replace all fixed posts with breakaway posts ▪ In accordance with the DoD Anti-Ram Vehicle Barrier List, boulders are not an approved type of passive barrier. Natural barriers such as boulders are not recommended since they must be specially designed and approved to stop a threat vehicle. Install an acceptable type of passive barrier from the DoD Anti-Ram Vehicle Barrier List. ▪ Install a new POST SPEED LIMIT sign that uses Type III sheeting or better ▪ Install a CHECKPOINT sign supplemented by an AHEAD plaque ▪ Remove the two arrow signs that are turned away from the road since they are not needed ▪ Properly restripe the AVBs ▪ Remove the stoppers in front of the BARRIER sign and delineate the sign with an OM3-R object marker ▪ Restripe the faded pavement markings in the response zone	7.1.1	Signing Improvements: $7,800 Pavement marking upgrades: $600 Remove the hedgehogs, planters, and traffic cones (optional): $1,200 Delineate the AVBs: $400 Remove the stoppers: $100

Location	Improvement	Report Section	Estimated Cost (2018 Dollars)
Dexter Gate	▪ Install white obstruction markings at the nose of the median in the approach and response zones between the 2 inbound lanes and between the 2 outbound lanes in accordance to Section 6 of the SDDCTEA Pamphlet 55-15 ▪ Optional - It is recommended to remove the barrels in the approach zone ▪ If the barrels are desired to remain, upgrade all barrel delineation to allow for full visibility of the barrels during nighttime hours ▪ Optional - If the intent of the barrels is to slow non-threat vehicles down, replace the barrels with speed humps and proper signage. ▪ Remove the YIELD sign between the two outbound lanes and install a YIELD sign on the far right-hand side of the roadway at the merging point of the two-outbound lanes ▪ If the barriers in the approach zone remain, install sigs and delineation per SDDCTEA Pamphlet 55-15 ▪ If a STOP sign is desired to remain at the ID check, install a supplemental PROCEED ONLY WHEN DIRECTED BY GUARD plaque ▪ Install a new POST SPEED LIMIT sign that uses Type III sheeting or better ▪ Restripe the faded pavement markings throughout the gate area ▪ Replace all fixed posts in the response zone with breakaway posts ▪ Close the gate at the first internal intersection and upgrade passive barrier to create a contiguous perimeter ▪ Properly restripe the AVBs ▪ Install a CHECKPOINT sign supplemented by an AHEAD plaque ▪ Install gate closure signage	7.1.2	Signing Improvements: $9,700 Pavement marking upgrades: $6,300 Install speed humps (optional): $10,000 Remove the barrels (optional): $750 Restripe the AVBs: $400 Passive barrier: Included in long-term costs

Location	Improvement	Report Section	Estimated Cost (2018 Dollars)
Stark Gate	▪ Install a CHECKPOINT sign supplemented by an AHEAD plaque in the approach zone ▪ Optional - It is recommended to remove the barrels in the approach zone ▪ If the barrels are desired to remain, upgrade all barrel delineation to allow for full visibility of the barrels during nighttime hours ▪ Install gate closure signage ▪ If a STOP sign is desired to remain at the ID check, a 30”x30” STOP sign should be installed with a supplemental plaque stating PROCEED ONLY WHEN DIRECTED BY GUARD ▪ Hatch the median island such that vehicles are directed back into their desired travel lane ▪ Gate off the two side roads immediately following the ID check area ▪ Remove the bollard in the outbound lane ▪ Install a CHECKPOINT sign supplemented by an AHEAD plaque in the outbound lane ▪ Properly restripe the AVBs ▪ Install a stop line adjacent to the STOP HERE ON RED sign for both the inbound and outbound lane ▪ Replace the speed limit sign with a 24”x30” sign that uses Type III sheeting or better ▪ Stripe a double-yellow centerline in the approach zone	7.1.3	Signing Improvements: $6,200 Pavement marking upgrades: $6,200 Remove the barrels (optional): $700 Remove bollard: $100 Restripe the AVBs: $400

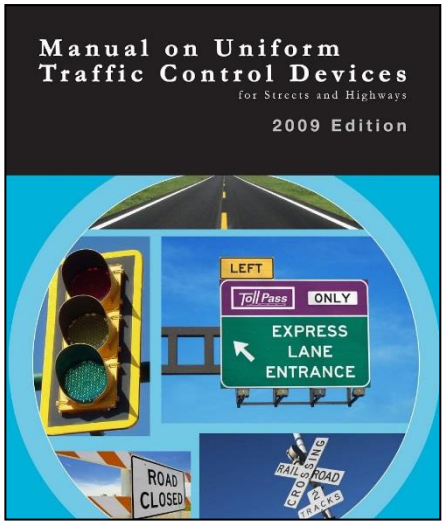
Location	Improvement	Report Section	Estimated Cost (2018 Dollars)

Dexter Gate	• Existing 2 ID check lanes for POV and commercial traffic
	• Canopy that extends over the right ID check lane
	• Pre-ID check turnaround designed for WB-67 trucks
	• Post-ID check rejection designed for WB-67 trucks
	• Sliding gates used over railroad tracks to allow train access
	• Existing overwatch to remain
	  ○ Additional overwatch parking space added
	• AVB's located at the proper location to contain threat scenarios
	  ○ Utilizes conventional signs and signals AVB Safety System with advance speed detection and wrong-way detection for the outbound lanes
	• Passive barrier installed to create a secured perimeter
		7.6.1	$1,000,000

Stark Gate	• Existing ID check lane for POV traffic • Canopy that extends over the ID check lane • Post-ID check rejection designed for WB-67 trucks • Existing overwatch to remain • AVB's located at the proper location to contain threat scenarios ○ Utilizes conventional signs and signals AVB Safety System with advance speed detection and wrong-way detection for the outbound lanes • Passive barrier installed to create a secured and contiguous perimeter	7.6.2	$1,300,000

1.3. Military Traffic Engineering Standards

It is important to note that the options presented in this study include not only those improvements required for future installation-wide development, but also improvements to address deficiencies that currently exist. All military installations are required to follow Army Regulation 55-80, DoD Transportation Engineering Program. This reference sets forth the following requirements:



"Installation commanders will develop and maintain their roadways to nationally accepted standards and provide a safe driving environment for all drivers and passengers."

"All installation traffic signals, signs, and pavement markings will be in substantial conformance to FHWA's Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) (http://mutcd.fhwa.dot.gov). Variances in the design and application of installation traffic control devices from the standards contained in the MUTCD must be approved by SDDC and FHWA." Other relevant publications include:

- DoD Supplement to the MUTCD
  - http://www.sddc.army.mil/sites/TEA/Functions/SpecialAssistant/TrafficEngineeringBranch/Documents/MUTCD_DOD_Supplement_Revision_20150601.pdf

Arkansas has no state MUTCD and no supplement to the MUTCD.
This authority is supported by:

- Federal Law Title 23: Highways, Chapter I, Subchapter G, Part 555, subpart f: Traffic Control Devices on Federal – Aid and other streets and highways
- Federal Law Title 32: National Defense, Chapter 5, Subchapter I, Part 634, subpart D: Traffic Supervision
- A Final Ruling by FHWA as published as part of the Federal Register in December 2009, which requires the MUTCD be used on military installations.

1.4. Contact Information

A review of traffic data, analyses, plans and drawings, and field assessments are the basis for the findings and engineering improvements presented in this report. SDDCTEA was the project lead on the development of this study. Please refer all questions regarding the improvements in this report to SDDCTEA.

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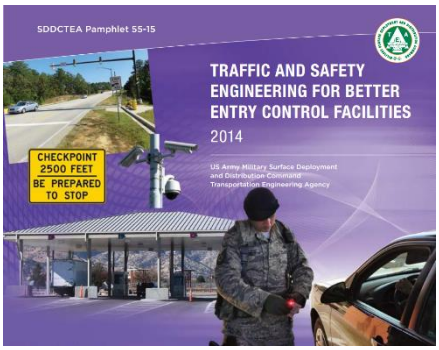
1.5. SDDCTEA Resources and Services

SDDCTEA Traffic Engineering Branch's mission is to improve highway safety and reduce traffic congestion on DoD installation roads and on installation access routes.

Program goals include:

- Providing guidance and executing approval authority on traffic engineering matters
- Assisting installations with traffic engineering studies with an emphasis on identifying low-cost improvements that yield high benefits
- Implementing programs that save lives, decrease injuries, minimize lost time, and maintain readiness

In addition to comprehensive traffic engineering and planning studies, SDDCTEA provides a wide range of resources and references. SDDCTEA's training and education services include the following:

Training and Education Program	Subject Matter Covered
Traffic Engineering and Highway Safety Bulletins Bulletins are published four to five times per year and address a broad range of transportation and safety topics. Bulletins are available online at: http://www.sddc.army.mil/sites/TEA/Functions/SpecialAssistant/TrafficEngineeringBranch/Pages/bulletins.aspx	Recent bulletins include: ▪ Sign Management ▪ Work Zone Safety ▪ Mine Resistant Ambush-Protected (MRAP) Vehicles ▪ Shuttle Bus Systems ▪ Road Safety Assessments ▪ Crashes: Reporting, Studies, and Countermeasures ▪ Accessibility Compliance for Military Installations
Pamphlets SDDCTEA has produced a variety of pamphlets and manuals on transportation issues. These materials provide specific, detailed engineering guidance on key issues. Pamphlets and materials are also available online at: http://www.sddc.army.mil/sites/TEA/Functions/SpecialAssistant/TrafficEngineeringBranch/Pages/pamphlets.aspx	▪ Pamphlet 55-8, Traffic Engineering Studies Reference ▪ Pamphlet 55-15, Traffic and Safety Engineering for Better Entry Control Facilities ▪ Pamphlet 55-17, Better Military Traffic Engineering 

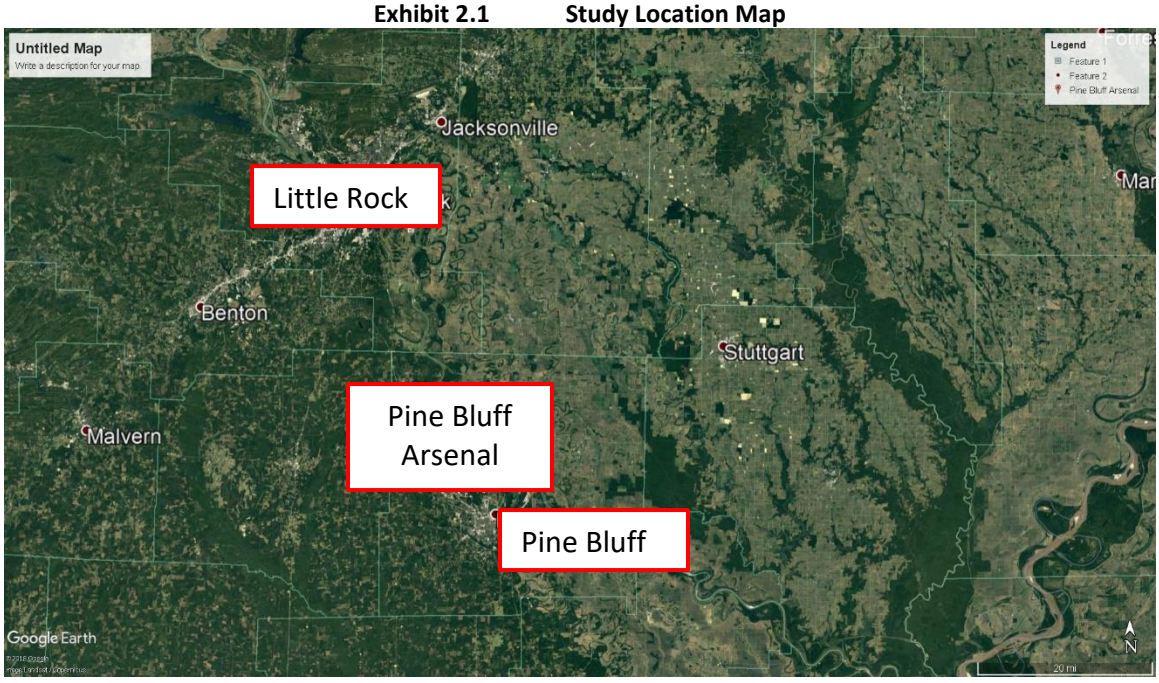
Training and Education Program	Subject Matter Covered
Better Military Traffic Engineering SDDCTEA has developed an interactive multimedia website, called Better Military Traffic Engineering (BMTE). The website is designed to provide the military engineering community with information regarding the proper use of traffic control and safety devices on military installations. The BMTE website is an instructional tool to train installation personnel, and can be used as a reference tool. **Access the BMTE website at:** http://www.sddc.army.mil/sites/TEA/Functions/SpecialAssistant/TrafficEngineeringBranch/BMTE/Pages/default.aspx	The BMTE is divided into sections, each containing a different topic: ▪ Signs & Markings ▪ Intersections ▪ Traffic Signals ▪ Parking ▪ Roadside Safety ▪ Entry Control Facilities Each section of the website has tutorials along with several traffic calculators for reference when planning a variety of traffic engineering projects.
Access Control Point/Entry Control Facility Software The purpose of the ACP/ECF SMART Decision Evaluator software is to help decide the best configuration for an ECF: to provide different scenarios that help to right-size the number of ID check lanes, with the optimal number of guards in order to minimize construction and operating costs, minimize risk, minimize environmental effects, obtain an acceptable maximum vehicle queue length, and obtain the greatest reasonable level of service in terms of overall delay to entering vehicles. Contact SDDCTEA to request access to the ACP/ECF SMART Decision Evaluator software.	The ACP/ECF SMART Decision Evaluator software aims to assist ACP/ECF planners in assessing the impacts of their decisions by: • Providing a comprehensive perspective of various • ACP/ECF issues • Providing the ramifications of different scenarios The ACP/ECF SMART Decision Evaluator software uses common engineering, security and economic principals and compares various metrics for different processing methods and ID check lanes. The purpose of the user guide is to outline and describe the capabilities and requirements of the ACP/ECF SMART Decision Evaluator software as well as the background calculations used.
Traffic Engineering and Safety Seminars (TES) SDDCTEA TES Seminars are conducted three to four times a year at military installations within the continental United States (CONUS) and when possible at military installations outside CONUS (OCONUS). The announcement flyer is available online at: http://www.sddc.army.mil/sites/TEA/Pages/default.aspx	The purpose of these seminars is to provide guidance on traffic engineering and safety considerations along roadways, intersections, and at access control points. Information is also provided on planning, design, and operations of access control points, considering security, safety, and traffic requirements.

2. INTRODUCTION

2.1. Installation Background and Location

Established in 1941, Pine Bluff Arsenal's (PBA) initial mission was to manufacture grenades and bombs in World War II, but it quickly escalated to the loading and the storage of these as well as war gases. PBA fulfills the Department of Defense's replenishment requirements by providing the U.S. and Allied Forces with products and services that are unavailable from other sources. The Arsenal also provides training and logistical support for the Department of Homeland Security and the American Red Cross. PBA is in the Pine Bluff/White Hall area of southeast Arkansas, and is 35 miles southeast of Little Rock. A location map is provided as exhibit 2.1.

Exhibit 2.1 Study Location Map



2.2. Study Purpose and Goals

The Military Surface Deployment and Distribution Command, Transportation Engineering Agency (SDDCTEA), through Gannett Fleming, conducted an Access Control Point Study at Pine Bluff Arsenal, Arkansas. This report provides short-term improvements to address existing deficiencies and interim and long-term conceptual designs to address future growth, capacity issues and noncompliance with the standards.

Specific focuses of this study include:

- Data Collection
- Existing Conditions Analysis
- Future Traffic Volume Projections
- Access Control Point (ACP) Assessment
- Roadside Safety Assessment
- Future Conditions Analysis
- Improvement Options and Costs

2.3. Study Schedule

Notice-to-proceed for this study was given on 15 January 2018. Kick-off meetings and data collection activities were conducted during the week of 26 February 2018. While on-site, the study team collected traffic data, photographed observations, recorded notes, and participated in key meetings. Meetings allowed the study team to receive input on areas of concern from the project stakeholders.

The detailed study schedule is as follows:

- Inbrief Meeting – 26 February 2018
- Data Collection – 26 February 2018 – 2 March 2018
- Draft Report to SDDCTEA – April 2018
- Outbrief Meeting – 24 May 2018
- Draft Final Report – July 2018
- Final Report – August 2018

2.4. Study Stakeholders

The goals and objectives for this study were developed in coordination with study stakeholders who participated in the 26 February 2018 kick-off meeting and provided information for this study. The stakeholder team is as follows:

Name	Organization	Phone	Email
Mark Metil	Gannett Fleming	717-763-7212	mmetil@gfnet.com
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Tim Fox	PBA-DPW	870-540-3132	Timothy.h.fox.civ@mail.mil
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John Webber	D/LES + S	870-540-3497	John.w.webber2.civ@mail.mil
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Tim Fox was the point of contact on behalf of Pine Bluff Arsenal. Mike Carda was the point of contact on behalf of SDDCTEA.

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Phone: 618-220-5450

2.5. Resources and References

Existing and proposed conditions were analyzed using transportation engineering and safety standards as documented in the following table:

Focus	Resources
Traffic Engineering and Safety	▪ Manual on Uniform Traffic Control Devices (MUTCD), FHWA, 2009 (with 2012 revisions) ▪ DoD Supplement to the MUTCD, SDDCTEA, 2015 ▪ Standard Highway Signs, FHWA, 2004 (2012 Supplement) ▪ Highway Capacity Manual (HCM), Transportation Research Board Special Report 209, 2010 ▪ Traffic Engineering Handbook, 7th Edition, Institute of Transportation Engineers (ITE), 2016 ▪ Trip Generation Manual, 10th Edition, ITE, 2017 ▪ NCHRP Report 500, Guidance for Implementation of the AASHTO Strategic Highway Safety Plan, Volume 10: A Guide for Reducing Collisions Involving Pedestrians, Transportation Research Board, 2004 ▪ NCHRP Report 672, Roundabouts: An Informational Guide, Second Edition, Transportation Research Board, 2010 ▪ SDDCTEA Pamphlet 55-17, Better Military Traffic Engineering, 2016 ▪ SDDCTEA Pamphlet 55-17, Better Military Traffic Engineering, Addendum – Revised Crosswalk Guidelines ▪ UFC 3-530-01: Design: Interior and Exterior Lighting and Controls, 2015 (with 2016 Change 3)
Geometric Design	▪ A Policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials (AASHTO), 2011 ▪ Roadside Design Guide, American Association of State Highway and Transportation Officials (AASHTO), 2011 ▪ UFC 3-201-01: Civil Engineering, 2013 (with 2017 Change 1)
Security and Access Control Points	▪ DoD 5200.08-R, Physical Security System ▪ DoD O-2000.12-H, DoD Antiterrorism Handbook ▪ HSPD-12 ▪ SDDCTEA Pamphlet 55-15, Traffic and Safety Engineering for Better Entry Control Facilities, 2014 ▪ Department of the Army, Army Access Control Points Standard Design/Criteria, 2009 and updated in 2012 with a supplemental document entitled The Army Standard for Access Control Points ▪ UFC 4-010-01 DoD Minimum Antiterrorism Standards for Buildings, 2013 ▪ UFC 4-010-02 DoD Minimum Standoff Distances for Buildings, 2012 ▪ UFC 4-020-01 DoD Security Engineering Facilities Planning Manual, 2008 ▪ UFC 4-020-02FA Security Engineering: Concept Design, 2005 ▪ UFC 4-020-03FA Security Engineering: Final Design, 2005 ▪ UFC 4-022-01 Security Engineering: Entry Control Facilities/Access Control Points, 2017 ▪ UFC 4-022-02 Selection and Application of Vehicle Barriers, 2010 ▪ Unified Facilities Guide Specification (UFGS) 34 4126.00 10 Access Control Point System – 2009 ▪ DoD Anti-Ram Vehicle Barrier List, September 2017 Additional resources at http://www.wbdg.org/resources/ufc_isc.php
Software	▪ Highway Capacity Software (HCS), developed by FHWA and distributed by McTrans ▪ SYNCHRO 10 Software, distributed by Trafficware ▪ ACP/ECF SMART Decision Evaluator, developed by SDDCTEA
Costs	▪ Costs are from RSMeans Heavy Construction Cost Data or the Protective Design Center ▪ DoD Area Cost Factors utilized specific to installation

2.6. Stakeholder Supplied Data

To assist in developing the study, stakeholders provided the following resources for consideration. These resources were utilized in developing future traffic forecasts, assessing future transportation needs and identifying existing deficiencies.

- PBA ACP Issues/Proposals which includes information on the Mission District Area Development Plan
- Aerial Imagery

3. GUIDANCE

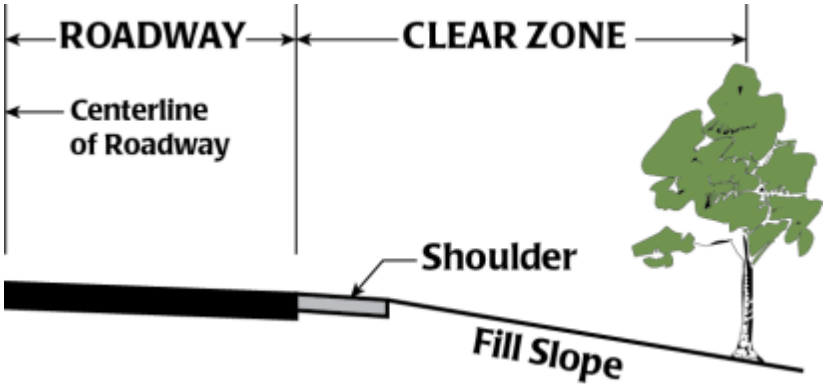
This section provides general guidance for roadside safety, signing, pavement markings and pedestrian accommodations. Additional guidance for these and other safety and operations areas (i.e., signs and pedestrian accommodations) can be found in the most recent version of *SDDCTEA Pamphlet 55-17, Better Military Traffic Engineering*. Subsequent sections of this report discuss specific deficiencies and corrective actions for the study intersections and ACPs.

3.1. Roadside Safety Overview

3.1.1. Clear Zones

The forgiving road concept includes the development of roadside clear zones. A clear zone is the total roadside border area, starting at the edge of the traveled way that is available for safe use by errant vehicles as shown in exhibit 3.1.

Exhibit 3.1 The Clear Zone Concept



A safe design requires a minimum width for the roadway clear zone. This area may consist of a shoulder, a recoverable area, a non-recoverable slope, and/or a clear run-out area. The desired clear zone width depends on traffic volumes, speed, and roadside geometry. Increasing the roadside clear zone is the best way to limit crashes involving fixed objects. The intent of a wider clear zone is to minimize crashes for those motorists who run off the road. Use exhibit 3.2 to determine the required clear zone width.

Exhibit 3.2 Clear Zone Width Requirements

DESIGN SPEED	DESIGN ADT	FILL SLOPES			CUT SLOPES		
		6:1 OR FLATTER	5:1 TO 4:1	3:1	3:1	4:1 TO 5:1	6:1 OR FLATTER
40 MPH OR LESS	Under 750	7-10	7-10	*	7-10	7-10	7-10
	750-1500	10-12	12-14	*	12-14	12-14	12-14
	1500-6000	12-14	14-16	*	14-16	14-16	14-16
	Over 6000	14-16	16-18	*	16-18	16-18	16-18
45–50 MPH	Under 750	10-12	12-14	*	8-10	8-10	10-12
	750-1500	14-16	16-20	*	10-12	12-14	14-16
	1500-6000	16-18	20-26	*	12-14	14-16	16-18
	Over 6000	20-22	24-28	*	14-16	18-20	20-22

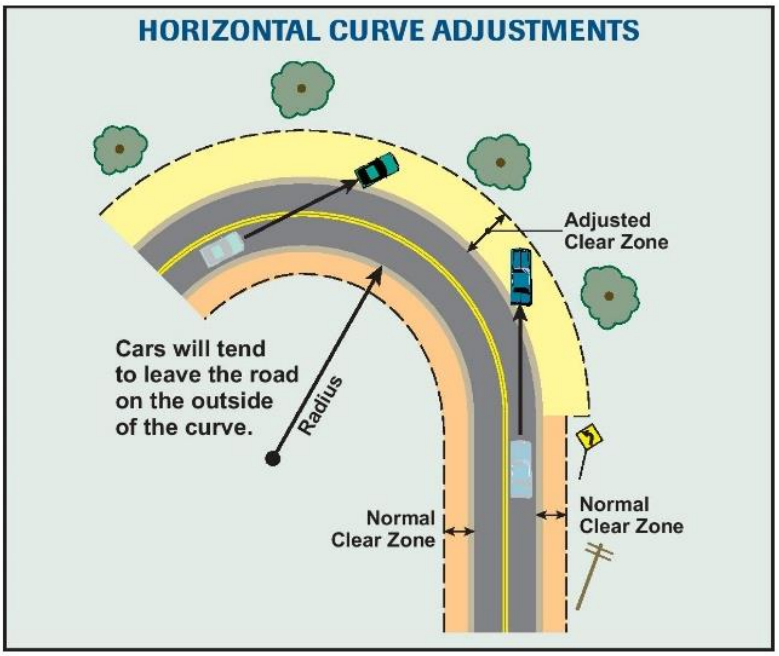
** Since recovery is less likely on the unshielded, traversable 3:1 slopes, fixed objects should not be present in the vicinity of the toe of these slopes. Determination of the width of the recovery area at the toe of slope should take into consideration right-of-way availability, environmental concerns, economic factors, safety needs, and crash histories. Also, the distance between the edge of the through travel lane and the beginning of the 3:1 slope should influence the recovery area provided at the toe of the slope.*

Source: AASHTO Roadside Design Guide, Table 3-1

The clear zones described in exhibit 3.2 are appropriate for tangent sections and the inside of horizontal curves. On the outside of horizontal curves, multiply the width in exhibit 3.2 by the correction factor given in exhibit 3.3. For curves with a radius greater than 2,900 feet (880 meters), a correction factor for the outside of the curve is not necessary.

Exhibit 3.3 Horizontal Curve Clear Zone Correction Factor

Radius (ft)	Design Speed (mph)		
	40	45	50
2900	1.08	1.10	1.12
2300	1.10	1.12	1.15
1950	1.11	1.15	1.18
1650	1.13	1.17	1.22
1450	1.15	1.19	1.25
1300	1.17	1.22	1.28
1150	1.19	1.24	1.31
1000	1.23	1.29	1.36
850	1.26	1.34	1.42
750	1.30	1.38	1.48
650	1.34	1.43	1.53
600	1.37	1.47	-
400	1.54	-	-



3.1.2. Lateral Offset for Urban Areas

Urban environments are characterized by sidewalks beginning at the face of the curb, enclosed drainage, numerous fixed objects (e.g., signs, utility poles, luminaire supports, fire hydrants, etc.), and frequent traffic stops. In these constrained settings, it is frequently not possible to obtain the appropriate clear zone due to the limited right of way for roadside features, since urban areas are often more developed.

As stated in AASHTO, "Typical conditions for these types of roads or streets include lower speeds, dense abutting development, limited right-of-way, closely spaced intersections and accesses to properties, higher traffic volumes, and the presence of special users, including mass transit vehicles, delivery trucks, bicycles, and pedestrians." In this type of environment, where the clear roadside concept cannot be achieved, a lateral offset to vertical obstructions (i.e., fixed objects) is needed to accommodate motorists driving on the roadway. Urban areas often use curbing. With curbing, fixed objects should never be located closer than 1.5 feet from the face of curbing, with 3 feet provided at intersections. This minimum lateral offset distance is intended only to provide sufficient clearance for the overhang of a truck to avoid striking an object, and should not be misconstrued as satisfying the clear roadside concept.

However, per the AASHTO Roadside Design Guide, "Research has shown that in an urban environment, approximately 80 percent of roadside crashes involved an object with a lateral offset from the curb face equal to or less than 4 feet and more than 90 percent of urban roadside crashes have a lateral offset less than or equal to 6 feet." Considering this, an enhanced lateral offset of 4 to 6 feet is more appropriate for this type of environment.

AASHTO has identified the critical urban roadside locations that are more prone to crashes and, as illustrated in exhibit 3.4, established specific lateral offsets for these unique locations. However, it is important to remember that these are reasonable goals when the clear zone widths suggested in exhibit 3.2 cannot be achieved, and again should not be misconstrued as satisfying the clear roadside concept. Illustrations, taken from the AASHTO Roadside Design Guide, follow exhibit 3.4 to assist in understanding the given offsets.

Exhibit 3.4 Urban Lateral Offset Distances

URBAN ROADWAY CONDITION	*MINIMUM LATERAL OFFSET (FEET)
Urban Roadway, Curbed Section	4
Urban Roadway, Curbed Section, Outside of Curves	6
Urban Roadway, No Curbing Present	8
Urban Roadway, No Curbing Present, Outside of Curves	12
Urban Roadway, Curbed Section, In Area of Merge	12
Urban Roadway, Curbed Section, In Area of Driveways	10-15

* measured from the face of the curb, if applicable

Exhibit 3.5 Lateral Offset for Objects at Horizontal Curves on Curbed Facilities

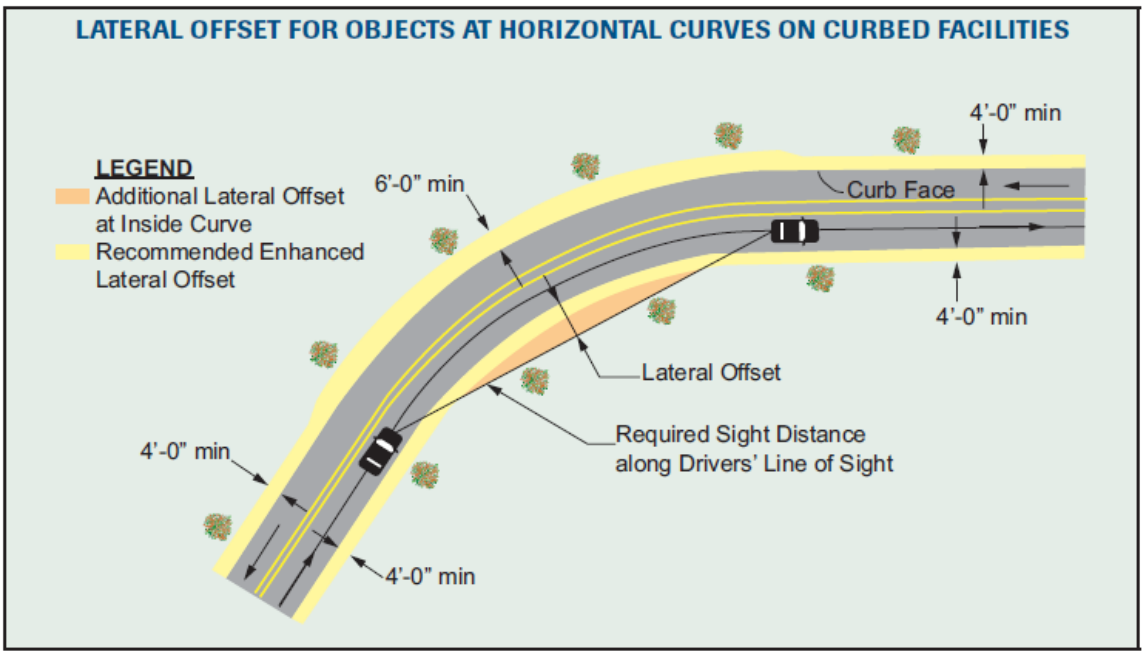


Exhibit 3.6 Enhanced Lateral Offsets at Merge Points

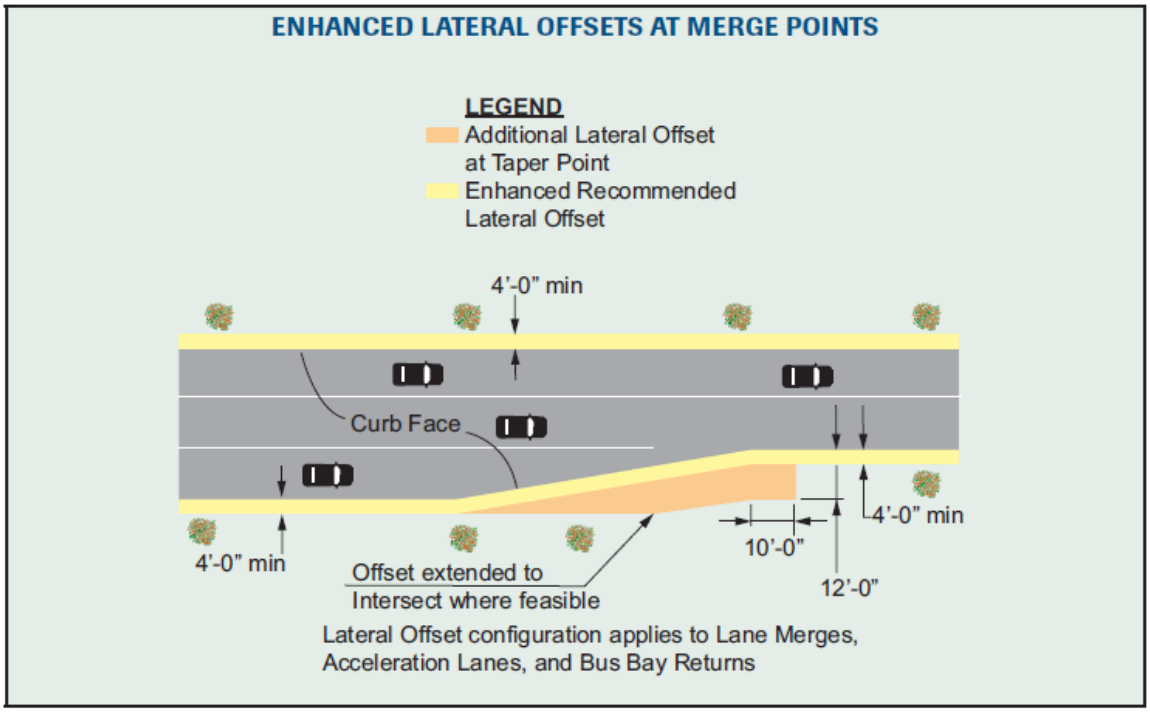
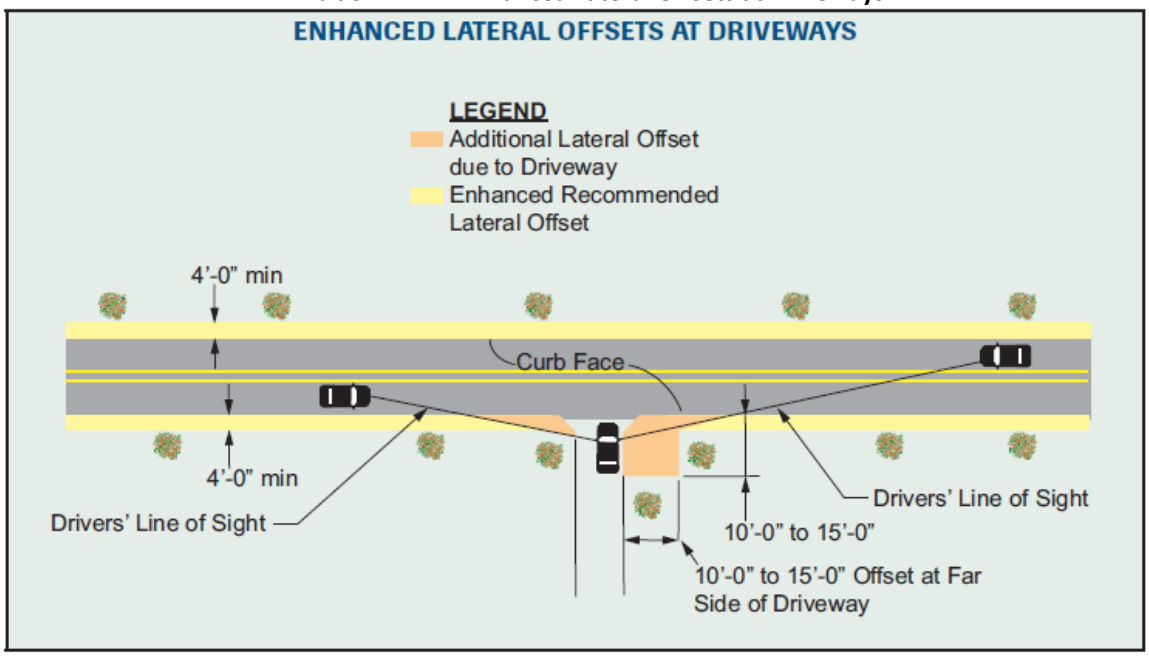


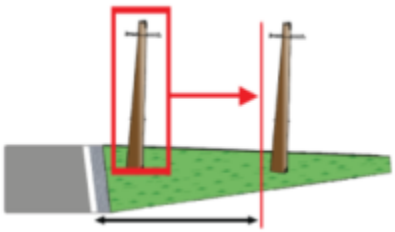
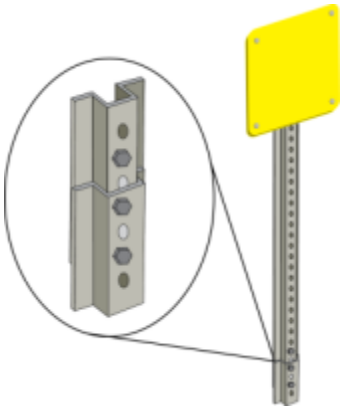
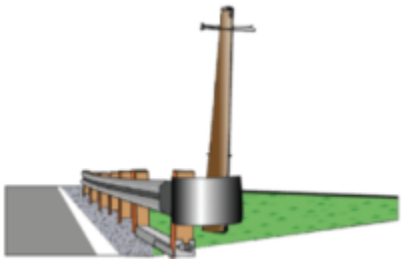
Exhibit 3.7 Enhanced Lateral Offsets at Driveways



3.1.2.1. Common Roadway Hazards and Mitigation Strategies

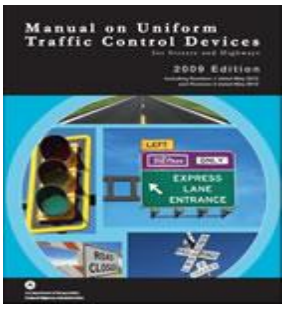
There are five main options to mitigate any hazards that are located within a clear zone. These options are presented in exhibit 3.8 beginning with the most preferred option.

Exhibit 3.8 Options to Mitigate Clear Zone Hazards

OPTION 1		Remove the hazard.
OPTION 2		Relocate the hazard (outside the clear zone).
OPTION 3		Reduce the impact severity (breakaway support).
OPTION 4		Shield the hazard with a traffic barrier (guardrail).
OPTION 5		Delineate the hazard with an object marker.

3.2. Signing Overview

3.2.1. MUTCD and the Military



Military installations must adhere to the Manual on Uniform Traffic Control Devices (2009 MUTCD with Revision Numbers 1 and 2, dated May 2012), which provides guidance on the implementation and configuration of traffic control devices.

MUTCD and Military Requirements

Multi-Service Regulation (AR 55-80, OPNAVINST 11210.2, AFMAN 32-1017, MCO 11210.2D, and DLAR 4500.19) on the Department of Defense (DOD) Transportation Engineering Program identifies in Section 3-11 the Military's Highway Safety Program requirements:

- ✓ Under General, "This section prescribes the policies and procedures related to DOD highway safety needs. It implements 23 USC 402, DODD 4510.11, and DODI 6055.4."
- ✓ Under General, **"This regulation applies to all military installations and activity sites that have streets and/or parking facilities, and a workforce of 1,000 or more personnel."**
- ✓ Under Policies, **"Installation commanders will develop and maintain their roadways to nationally accepted standards that provide a safe driving environment for all drivers and passengers."**
- ✓ Under Traffic Control Device Plan, "This plan provides for the periodic review of existing traffic control devices and the systematic replacement of substandard and deteriorated devices. All **installation traffic signals, signs, and pavement markings will be in substantial conformance to FHWA's Manual on Uniform Traffic Control Devices for Streets and Highways** (MUTCD) (http://mutcd.fhwa.dot.gov). **Variances in the design and application of installation traffic control devices from the standards contained in MUTCD must be approved by MTMC (now SDDCTEA) and FHWA."**

Other supporting regulations include:

- ✓ DODD 4510.11 on DOD Transportation Engineering
- ✓ DODD 4715.1 on Environmental Security
- ✓ DODI 6055.4 on DOD Traffic Safety Program
- ✓ DOD Supplement to the MUTCD

3.2.2. Basic MUTCD Signing Considerations

Traffic signs should meet the following five requirements:

- **Fulfill a need** – to determine if a sign will fulfill a need, a traffic engineering study must be completed to collect and analyze data.
- **Command attention** – when developing a signing plan, it is important to use only signs motorists will understand, which are signs of the types included in the MUTCD.
- **Convey a clear, simple meaning** – whenever possible, use symbol signs instead of legend messages. Symbol signs are legible from greater distances, and they help non-English-speaking people understand the message.
- **Command respect from road users** – to command respect, sign messages must be realistic, legible, visible, and placed correctly.
- **Allow adequate time for proper response** – signs should be spaced a minimum of 100 feet from other signs so that drivers have adequate time to read a sign before having to read another sign.

3.2.2.1. Fixed Sign Posts

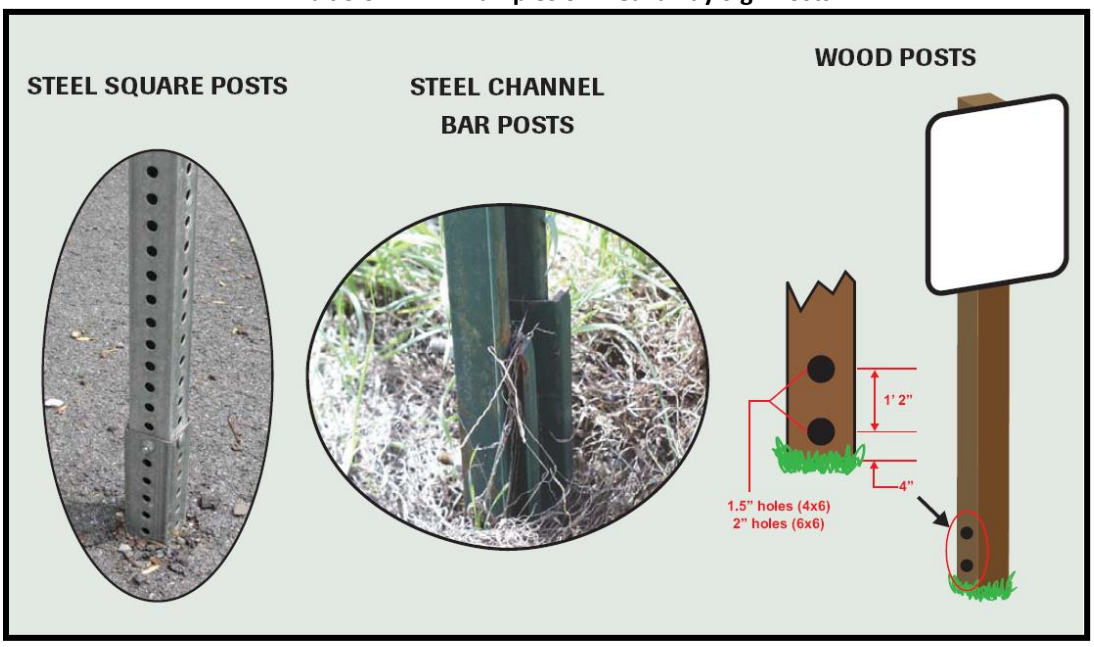
Fixed sign posts can become flying hazards when struck or can penetrate the vehicle body depending on the strength of material used. A safer alternative, referred to as a breakaway support, includes all types of devices that yield when hit by a vehicle. They yield because the design of the support purposely incorporates a weak spot. The remaining stub should be no higher than four inches above the ground line to prevent snagging on the vehicle's undercarriage.

The most common types of breakaway sign posts are:

- Steel square posts where the upper part nests inside a slightly larger anchor post
- Steel channel bar posts with a bolted connection at ground level
- Wood posts, typically with two drilled holes to create a "shear plane" for the post to break if impacted by a vehicle.

Exhibit 3.9 shows examples of some common breakaway post types.

Exhibit 3.9 Examples of Breakaway Sign Posts



3.2.2.2. Sign Retroreflectivity

Sign Retroreflectivity Background: The Federal Highway Administration's (FHWA) 2009 Manual on Uniform Traffic Control Devices (MUTCD) set forth federal requirements that military installations must meet several key traffic control sign compliance requirements between January 2012 and December 2019 for signs on any road used by the traveling public. The most significant of this is sign retroreflectivity. On May 14, 2012, the FHWA published final rules to revise the MUTCD provisions on compliance dates. Most compliance dates have been eliminated; however, it is important to note that the requirements still apply. When a sign has reached the end of its useful service life, it is to be replaced in accordance with these requirements. A brief overview of the MUTCD requirements and any applicable dates are as follows:

- Conform to new requirements relating to sign size, sign type, and placement.
- By **13 June 2014** (formerly January 2012), develop an installation-wide sign management system for the purpose of conforming to FHWA's requirement that agencies implement a program for the maintenance of minimum levels of retroreflectivity. The FHWA Methods to assess and maintain minimum sign retroreflectivity are detailed in exhibit 3.10.
- Ensure compliance with minimum retroreflectivity requirements, dependent on sign type.
- The MUTCD's intent is to promote traffic control device uniformity and consistency. This is of particular importance on military installations where roadways are traveled by government personnel from states all over the country. Failure to replace non-compliant devices at the end of a signs service life could result in withdrawal or withholding of Federal-aid funds. In addition, tort liability in lawsuits is another possible penalty for non-compliance, especially in situations where a crash has occurred that can be attributed to inadequate, inappropriate, or noncompliant traffic control devices.
- For more information on retroreflectivity, refer to the August 2012 SDDCTEA Traffic Engineering and Highway Safety Bulletin 12-04: *Sign Management Current Practices*.

Exhibit 3.10 FHWA Methods to Assess and Maintain Minimum Retroreflectivity

Methods	Advantages	Disadvantages
Visual Nighttime Inspection. At least every 2 years, inspect all signs at night by a trained sign inspector, driving at normal speeds and using low- beams. The inspector should be 60 or older and should evaluate the signs from the normal viewing distance, and the vehicle should be a 2000 model year or newer SUV or pick-up truck. Replace defective and marginally-acceptable signs.	✓ Helps evaluate sign orientation issues and other distractions	✓ Requires a trained, nighttime sign inspector ✓ Subjective and inaccurate ✓ Requires a frequent review ✓ Requires some type of inventory to document the signs that are acceptable, marginal, or defective
Measured Sign Retroreflectivity. Periodically measure the retroreflectivity of sign backgrounds and retroreflective legends. Replace the individual signs with substandard retroreflectivity values.	✓ Minimizes the number of prematurely replaced signs	✓ Requires a retroreflectometer ✓ Extremely labor intensive ✓ Potential hazards if climbing ladders ✓ Requires a good inventory system to document the retroreflectivity readings and to identify the signs that need replaced
Expected Sign Life. Replace individual signs based on the age of the sign and the expected sign life. To track the installation date, maintain a sign inventory or identify the year of installation on the back of the signs.	✓ Simple	✓ Requires a good inventory or a sign-dating system ✓ If using a sign-dating system, inspectors need to search for the target year signs
Blanket Sign Replacement. Replace all signs on the installation or area within the installation at the same time using the previous replacement date and the expected sign life. (A variation could be, replace all STOP signs in Year #1, Speed Limit signs in Year #2, other regulatory signs in Year #3, etc., but this will modify the advantages and disadvantages.)	✓ Reduces the mixing of old and new signs ✓ Lowest labor costs	✓ May prematurely replace some signs installed between blanket replacement cycles, e.g., signs that replaced signs damaged in crashes ✓ Special funding may be needed if the effort is base wide
Control Signs. Replace signs based on measured retroreflectivity of signs that represent the general population of signs purchased in the same basic timeframe. The control signs can either be installed in the field or in another location such as in a maintenance yard.	✓ Provides for year-to-year differences in materials	✓ Requires a retroreflectometer, and some type of inventory ✓ The number of batches of control signs could be extensive since multiple signs should be installed to represent all color combinations from different groups of sign purchases ✓ Routinely evaluating the retroreflectivity of all control signs could be very labor intensive

Sign Retroreflectivity Guidance: A general overview of retroreflectivity guidance is provided as follows:

- Retroreflectivity is the measure of an object's (sign's) ability to return light to the source (headlight). This primarily refers to nighttime visibility.
- Signs that are visible during daylight periods may not have acceptable retroreflective properties at night, as illustrated in exhibit 3.11.

Exhibit 3.11 Comparison of Retroreflectivity by Time of Day

Day

Night – Non-retroreflective

Night - Retroreflective

- During daylight periods, the driver has many "cues" such as signs, pavement markings, guardrails and objects along the road. At night, signs may be one of the few cues visible to drivers.
- Although the heaviest traffic volumes occur during the daytime, some workers arrive prior to sunrise, and the installation also has residents who may need to use the roadways at nighttime.
- The MUTCD sets retroreflectivity requirements that should be followed.
- Joint Services Military Regulations is requiring all installation traffic control devices to conform to the MUTCD.

Multiple types – or grades – of retroreflective materials are currently available for permanent signs as noted in exhibit 3.12.

- The retroreflective sheeting type for all regulatory, warning, and guide signs shall be Type III or better per the DOD Supplement to the MUTCD
- Type I and II sheeting are not recommended for the following reasons (per MUTCD Table 2A-3):
    - Type I sheeting is only permitted for regulatory signs; however, this sheeting when brand new barely meets minimum retroreflectivity levels.
    - Type II sheeting is permitted for warning and regulatory signs but also barely meets minimum retroreflectivity levels when brand new.
    - These sheeting types only have an expected sign life of approximately seven years compared to the 12 years or greater common with other sheeting types.

- Regulatory and warning signs with Type III or better sheeting should be installed to provide better visibility, especially at night. This sheeting is also less costly on a per year basis.

Exhibit 3.12 Available Types of Retroreflective Materials

Type of Retroreflective Material	Common Name	Life Expectancy (years)	Comments
I	Engineering Grade	7	These two types are not recommended.
II	Super-Engineering Grade	7-10	
III & IV	High-Intensity of High-Performance Grades	10+	Recommended material, except use a higher type material for all white legend on overhead signs.
VIII, IX & X	Super-High Intensity or Very High-Intensity Grades	10+	Microprismatic materials.

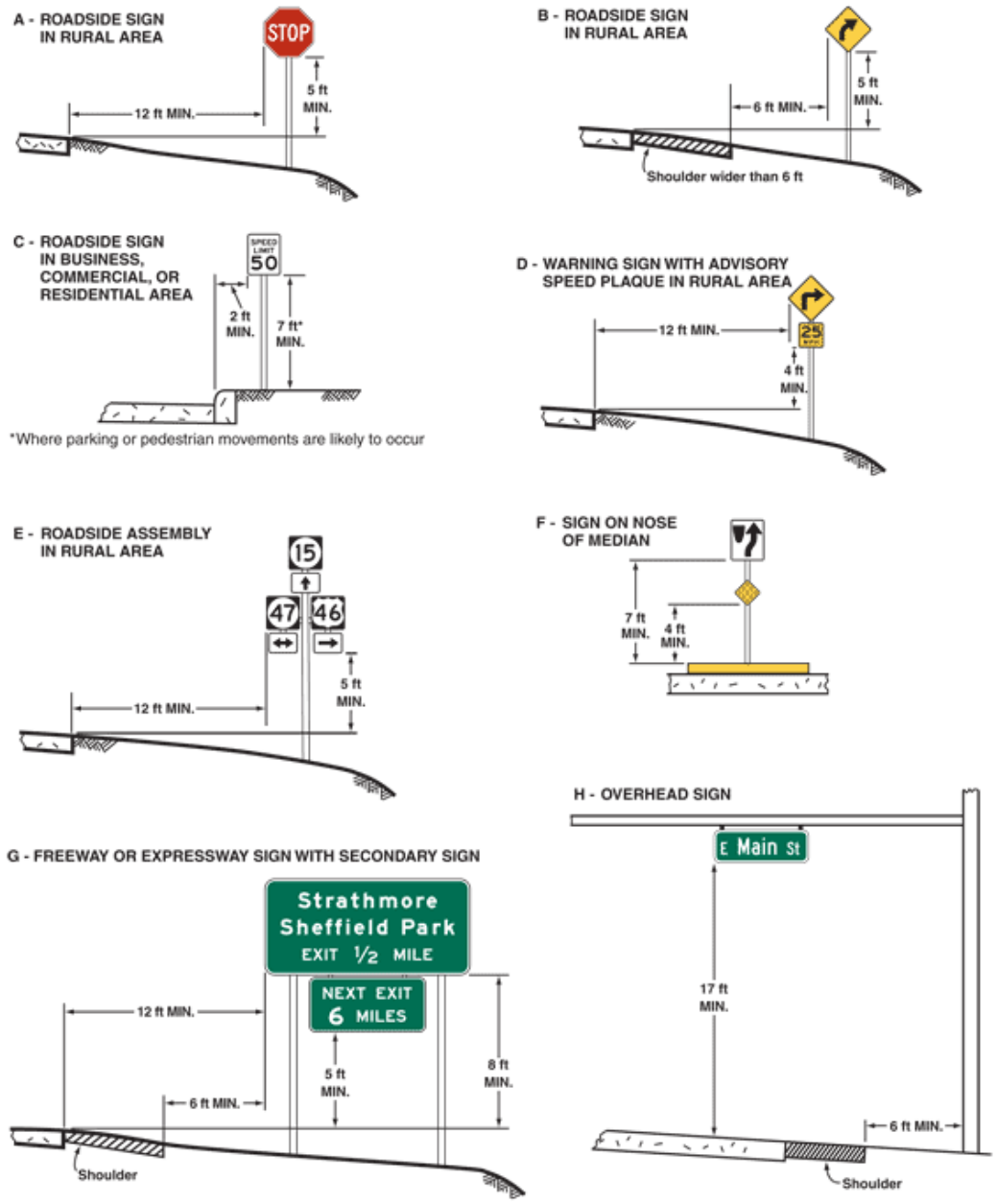
Sign Retroreflectivity Guidance and Costs:

- Replace all signs that are not at the minimum retroreflectivity level, per the MUTCD.
- Implement then continue to use a sign management system to maintain traffic sign retroreflectivity at or above established minimum levels in the MUTCD.
  - Ensure the management system includes the following data for each sign:
    - Location
    - Sign type
    - Year of install
    - Mounting type
    - Mounting height and placement
    - Sheeting grade and retroreflectivity requirements
  - Can be used as a systemic tool to upgrade signs based on the issues noted previously
  - Can be used to track sign life since retroreflectivity degrades over time
  - See exhibit 3.10 for the various sign maintenance methods and the advantages and disadvantages of each.
- General estimated cost information is as follows:
  - Post mounted sign (includes sign, post, installation, and removal of existing sign/post) $67/Sq Ft
  - New sign installed on existing post $22/Sq Ft
  - Removal of signs $37/Sq Ft

3.2.2.3. Sign Mounting Heights

Sign height and lateral placement promote a consistent, visible location while reducing the potential for vehicular conflicts. The MUTCD establishes the requirements for sign mounting height and lateral placement as shown in exhibit 3.13.

Exhibit 3.13 Sign Mounting Height and Lateral Clearance Guidelines



Note:
See Section 2A.19 for reduced lateral offset distances that may be used in areas where lateral offsets are limited, and in business, commercial, or residential areas where sidewalk width is limited or where existing poles are close to the curb.

3.2.2.4. Verbose or Illegible Signs

At traveling speeds, motorists cannot read signs with too many words. Some general guidance on sign messages is as follows:

- Signs with excessive or small wording might be ignored since drivers may have to slow down or even stop to read them.
- A good "rule-of-thumb" is that signs are legible from a distance of 40 feet for every one inch in the legend height. This means that a sign with 6-inch legend is legible from a maximum distance of about 240 feet.
- Use symbol messages when available.
- Use a minimum of 6-inch high lettering (except for signs like NO PARKING signs).
- Use the proper type legend from FHWA's *Standard Highway Signs* book.

3.2.2.5. Sign Clutter and Unrelated Signs Mounted on the Same Post

Unrelated signs should not be mounted on the same sign post. This practice can confuse motorists by mixing the messages that are intended by each sign. Similarly, posting too many signs close together can make it difficult for motorists to read and understand each sign at traveling speed. Signs should generally be spaced at a minimum of 150 feet from other signs so that drivers have adequate time to read a sign before being confronted with another sign.

3.2.2.6. Non-compliant and Inconsistent Signage

Using consistent, compliant signs will improve motorists' comprehension of the signs' messages. When non-compliant signs are used, motorists will require a longer time to read and understand the message. Considerations and guidance include:

- Signs should conform to MUTCD national standards to improve drivers' understanding of the sign message and reduce possible confusion.
- Consistent signing helps drivers to recognize signs more readily.
- Non-compliant signs do not command the respect of motorists and may be ignored.

3.3. Pavement Marking Overview

Pavement markings should be placed in accordance with the MUTCD. Pavement markings are categorized into two primary groups:

- Longitudinal markings help facilitate vehicle guidance and location.
- Transverse markings provide warning and regulatory information to the motorist.

3.3.1. Longitudinal Pavement Markings

A general overview of longitudinal pavement marking guidance is provided as follows:

- A combination single solid/broken yellow line should be used when passing is permitted in one direction only (adjacent to the broken yellow).
- Double yellow lines should be used when passing is prohibited in both directions.
- Solid white lines should be used to delineate the roadway edge and where lane changing is discouraged, such as approaching intersections and through ACP checkpoints.
- Exhibit 3.14 details the specific uses of all classes of longitudinal pavement markings.
- Exhibit 3.15 details the warrants for the use of centerlines and edge lines.
    - Intersection approach lanes should be separated by solid white lines.
    - Passing should be prohibited approaching and departing ACPs.
    - Passing should be prohibited approaching intersections.
    - Passing should be prohibited where there is not suitable sight distance.
    - Passing should be prohibited where roadside development includes many driveways and intersections where passing would create frequent potential conflicts.
    - Passing should be prohibited where a passing zone would otherwise be less than 400 feet in length.
- Old or conflicting pavement markings should be eradicated completely, preferably by high-pressure water blasting.
- Transition taper lengths should be designed according to the criteria in exhibit 3.16.

Exhibit 3.14 Longitudinal Pavement Marking Types

Solid Yellow Line	The solid yellow line indicates a no-passing zone applying to traffic with the solid line to its immediate left. Used alone, a single solid yellow line is only used to define the median of a freeway or divided roadway, or left edge of a one-way roadway.
Double Solid Yellow Line	A double solid yellow line divides lanes of traffic flow in opposing directions where passing is prohibited in both directions.
Broken Yellow Lines	A broken yellow line defines the center of a two-lane, two-way roadway where passing is permitted in both directions.
Combination Single Solid/Broken Yellow Line	This combination is used when passing is permitted in one direction (adjacent the broken yellow line), and prohibited in the other (adjacent the solid yellow line).
Broken White Lines	A broken white line is used to delineate lanes for travel in the same directions. Lane changing is permitted.
Solid White Line	A solid white line is used to mark the right edge of the roadway, and to mark lanes for travel in the same direction where lane changing is discouraged. Its normal application is as a lane line on multi-lane approaches to intersections and, particularly, to delineate left- and right-turn lanes.
Double Solid White Line	The double solid white line may be used between travel lanes in the same direction where crossing the double line is prohibited. For example, the double solid white line may be used on a bridge to prevent lane changing.
Dotted Lines	The dotted line delineates the extension of pavement markings through an intersection or interchange area. It should be the same width and color as the line it extends.

Source: FHWA, MUTCD

Exhibit 3.15 Warrants for Centerlines and Edgelines

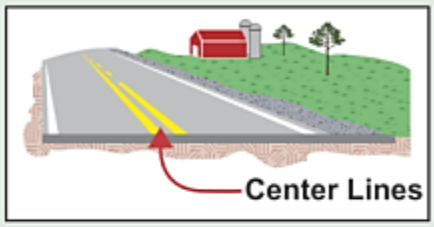
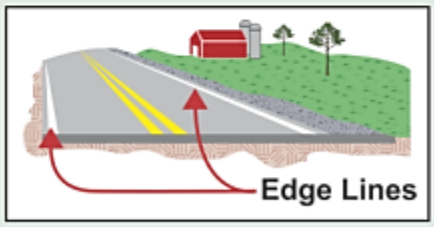
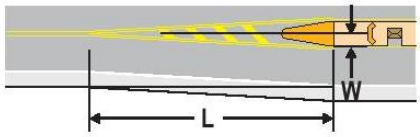
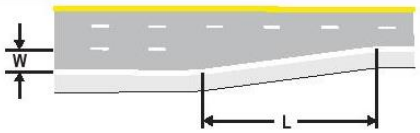
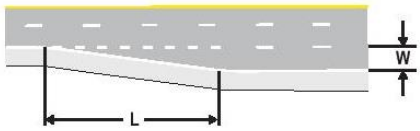
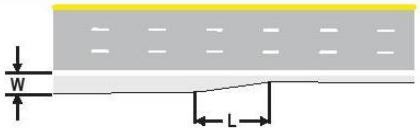
TYPE, PURPOSE, AND APPLICATION	*MUTCD* CRITERIA	BENEFITS
CENTER LINES  ✓ Provides separation of traffic traveling in opposite directions ✓ Provides delineation of separation	Standards: ✓ Mandatory for all paved urban arterials and collectors with a travel way width of 20 feet or more and an ADT of 6,000 or more ✓ Mandatory for all paved two-way streets or highways that have three or more traffic lanes Guidance: ✓ Should be placed on all urban arterials and collectors with a travel way of 20 feet or more and ADT of 4,000 or more ✓ Should be placed on all paved rural arterials with a travel way width of 18 feet or more and an ADT of 3,000 or more ✓ Should be placed on other paved areas and travel ways less than 16 feet wide as a traffic engineering assessment indicates	✓ 30% reduction in head-on crashes
EDGE LINES  ✓ Provides an edge of pavement guide for drivers ✓ May result in lower speeds since travel lanes appear narrower	Standard: ✓ Mandatory for freeways, expressways and paved rural arterials with travel way widths of 20 feet or more and an ADT of 6,000 or more Guidance: ✓ Should be placed on all rural arterials and collectors with a travel way of 20 feet or more and an ADT of 3,000 or more Options: ✓ May be placed where center lines are not present ✓ May be used to minimize driving on shoulders	✓ 11 to 25% reduction in run-off-the-road crashes

Exhibit 3.16 Transition Taper Design

TYPE		CRITERIA
LANE REDIRECTED *Source:* MUTCD *Fig 3B-15*		✓ Speeds less than 45 mph: $L = \frac{WS^2}{60}$ ✓ Speeds of 45 mph or more: $L = WS$ Minimum L = 100 feet in urban areas Minimum L = 200 feet in rural areas
LANE REDUCTION *Source:* MUTCD *Fig 3B-14 and AASHTO Green Book Equations 3-37 and 3-38*		✓ Speeds less than 45 mph: $L = \frac{WS^2}{60}$ ✓ Speeds of 45 mph or more: $L = WS$
LANE ADDED *Source: AASHTO Green Book Page 3-137*		✓ Speeds less than 45 mph: $L = \frac{WS^2}{90}$ ✓ Speeds of 45 mph or more: $L = \left(\frac{2}{3}\right) WS$ Minimum L = 100 feet in urban areas Minimum L = 200 feet in rural areas
SHOULDER-TO-CURB TRANSITION *Source: SDDCTEA*		✓ All speeds: L=10W (10:1 ratio) is recommended
W = Width of Lateral Shift (feet) S = Posted, 85th-percentile, or Statutory Speed (mph) L = Length of Taper (feet)		

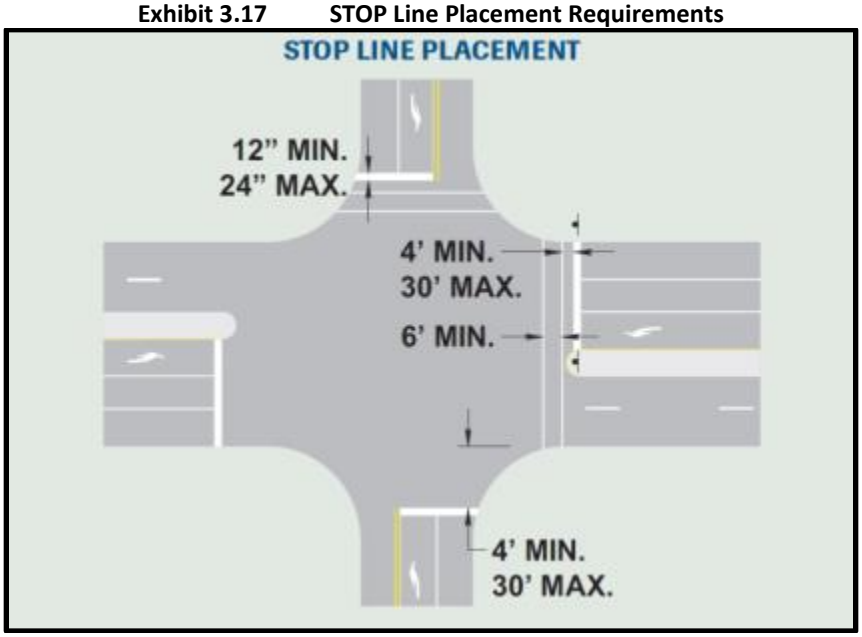
Source: MUTCD *and AASHTO Green Book*

3.3.2. Transverse Pavement Markings

A general overview of transverse pavement marking guidance is provided as follows:

- STOP lines may be used to supplement STOP signs and traffic signals. When used, the location of the STOP line is determined primarily by the geometry of the intersection, road width, sight distance, and the design-vehicle turn radius.
- STOP lines are not necessary at all stop locations. STOP lines may be provided to supplement STOP signs, but should be used to indicate the point behind which vehicles are required to stop in compliance with a traffic control device (as shown in exhibit 3.17).
- STOP lines are not required at crosswalks per the MUTCD; however, it is recommended to install a STOP line at a crosswalk. If used, STOP lines should be placed a minimum of 4-feet in advance of the crosswalk line at controlled intersections (as shown in exhibit 3.17).
- A STOP line is retroreflective white and is no less than 12 inches or more than 24 inches wide. The width depends on the speed of the roadway and/or the presence of hazardous conditions.
- If transverse lines are used to mark a crosswalk, the gap between the lines should not be less than 6 feet. In addition, the transverse lines shall not be less than 12 inches or greater than 24 inches in width.
- Pavement word and symbol markings may be used for guiding, warning, or regulating traffic.
- Pavement word and symbol markings shall be white with retroreflective properties.

Exhibit 3.17 STOP Line Placement Requirements



Pavement Marking Guidance and Costs:

- Consider implementing a pavement marking inventory and upgrade program.
  - Inventory existing pavement markings:
    - Location
    - Pavement marking type
    - Year of application
  - Can be used as a systemic tool to upgrade pavement markings based on the issues noted previously.
  - Can be used to track pavement marking life since retroreflectivity degrades over time and markings become worn and faded.
    - Review all pavement markings annually.
    - Expected pavement marking life is 2-3 years for waterborne markings.
    - Expected pavement marking life is 5-8 years for thermoplastic markings.
  - Eradicate all old and conflicting pavement markings.
- General cost information (for waterborne paint markings) is as follows:
  - Estimated cost of a new STOP line is $15 each.
  - Estimated cost of a new crosswalk is $225 each.
  - Estimated cost of double yellow lines is $1 per linear foot.
  - Estimated cost of single white lines is $0.50 per linear foot.
  - Estimated cost to remove pavement markings is $4 per square foot.

3.4. Pedestrian Accommodations Overview

Transportation enhancements should consider and accommodate pedestrians and bicycles where possible. This is critical at conflict areas such as intersections and at locations where land use characteristics encourage mid-block crossings. It is also important that new development consider and accommodate pedestrians. *NCHRP Report 500: Guidance for Implementation of the AASHTO Strategic Highway Safety Plan* states that, "Whether building new infrastructure or renovating existing facilities, it should be assumed that people will walk, and plans should be made to accommodate pedestrians."

3.4.1. Pedestrian Signing

All pedestrian signs should conform to the standards presented in the MUTCD, which are summarized and bulleted below:

- Pedestrian crossing signs should be limited to areas where a pedestrian crossing would not be expected by motorists. Since pedestrian crossings should be expected at intersections, pedestrian signs should not be used there.
- Signs should visually conform to the MUTCD standards.

- Pedestrian signs may be the standard yellow color of warning signs or they may be the fluorescent yellow-green color for added visibility.
- School Area signs, including the plaques mounted below them, are required to have a fluorescent yellow-green background with a black legend.
- Sign colors should not be intermixed within an area and instead a systematic approach should be used where one color is confined to a specific area or region.
- If the pedestrian crossing sign (W11-2) is used in advance of a crossing (i.e., at a midblock crossing or a crossing on an uncontrolled intersection approach), it should be supplemented with a plaque stating "Ahead" (W16-9P) or "XX Feet" (W16-2P). See sign W16-9P in exhibit 3.18.
- If the pedestrian crossing sign is used at the location of a crossing (i.e., at a midblock crossing or a crossing on an uncontrolled intersection approach), a diagonal downward arrow plaque (W16-7P) must be used, as shown in exhibit 3.18. Note that the background color for the W11-2 sign and supplemental plaques may also be fluorescent yellow-green.
- Exhibits 3.20-3.22 shows how the signs in exhibit 3.18 are used to sign midblock crosswalks and crossings in uncontrolled locations.

Exhibit 3.18 MUTCD-Approved Pedestrian Crossing Signs and Plaques

W11-2

W16-9P

W16-7P

Background color may also be fluorescent yellow-green for pedestrian warning signs and their accompanying plaques.

3.4.2. Use of Crosswalks

Crosswalks should not be used where speeds exceed 45 mph at unsignalized intersections and where sight distance is not adequate. Generally, crosswalks should be marked based on the following guidelines:

- Signalized intersections with pedestrian signal heads,
- Locations where a school crossing guard is normally stationed to assist children in crossing the street, and
- Intersections and mid-block crossings satisfying minimum vehicle and pedestrian volume guidelines.

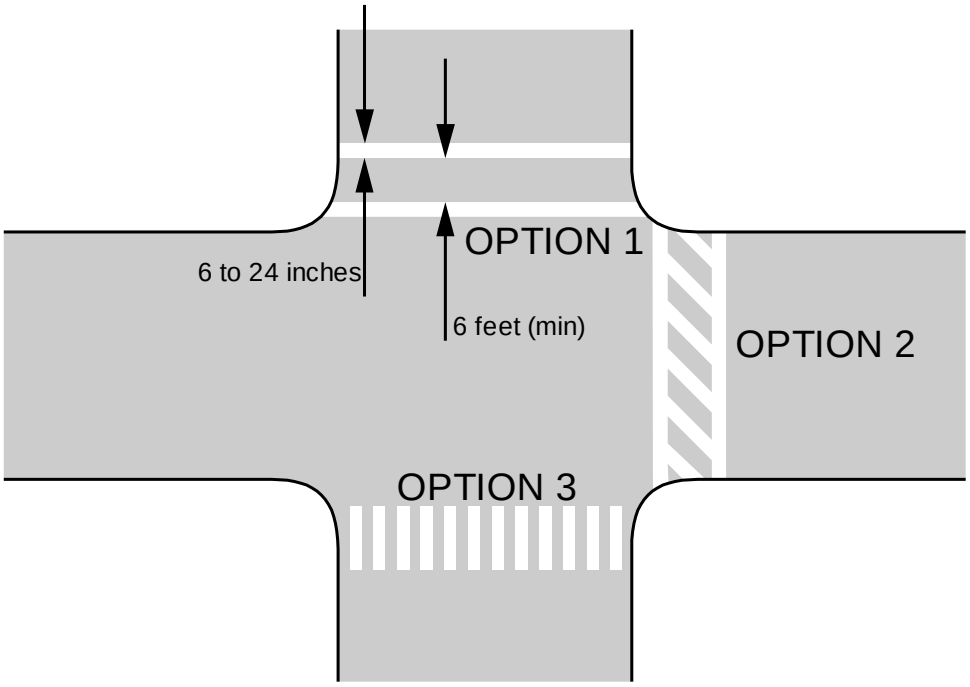
The law defines a *marked crosswalk* as a pedestrian crossing that is designated by surface markings and an *unmarked crosswalk* as the extension of a sidewalk across intersecting roadways.

An *uncontrolled location* is a roadway intersection or other mid-block crossing that is not controlled by either a traffic signal or a stop sign. Uncontrolled locations can be the most challenging places to provide a safe pedestrian crossing. A *mid-block crossing* is a pedestrian crossing that is not located at a roadway intersection. If a mid-block crossing is not designated by a marked crosswalk, then pedestrians must yield the right-of-way to motorists.

3.4.3. Crosswalk Markings

Exhibit 3.19 shows suggested crosswalk markings from the MUTCD. Option 1 uses two transverse lines to mark the extents of the crosswalk. Option 2 adds white diagonal lines aligned 45-degrees to the flow of vehicular traffic for added visibility. Option 3 also provides added visibility with white longitudinal lines running parallel to vehicular traffic.

Exhibit 3.19 Crosswalk Alternatives



Crosswalk lines should be between 12 inches and 24 inches wide. The total width of the crosswalk should be no less than 6 feet wide.

3.4.4. Crosswalk Warrant Criteria at Midblock Locations and on Uncontrolled Approaches

Crosswalk lines should not be used indiscriminately. An engineering study should be performed before they are installed at uncontrolled locations. Uncontrolled refers to the absence of traffic control (yield, stop or signals) on the approach to a crosswalk.

This section provides criteria for marking a pedestrian crossing at a midblock location or on an uncontrolled approach to an intersection. If warrants are met and a crosswalk is marked, additional enhancements will be required. Warrants and recommended enhancements, within this document, apply to school zones; however, refer to Part 7 of the MUTCD for specific signs to use at school crosswalks. The marking criteria and drawings for crossings at midblock locations and on uncontrolled intersection approaches shown in this report were developed by the SDDCTEA.

For a proposed crosswalk at midblock or on an uncontrolled approach to an intersection, the following two criteria shall be satisfied in conjunction with the proposed marked crosswalk:

- The crosswalk shall provide adequate sight distance; to include vertical, horizontal, and intersection stopping sight distance.
- The crosswalk shall not cross any part of an auxiliary lane and its transition. Auxiliary lanes include left turn, right turn, and acceleration/deceleration lanes. Two-way left-turn lanes are not considered auxiliary lanes.

Locations being considered for a crosswalk (midblock or an uncontrolled approach to an intersection) should have a minimum level of traffic and pedestrian volumes. All of the following four criteria should be satisfied prior to installation:

- Location of midblock crossings should be a minimum of 300 feet (200 feet with an engineering study) from any controlled intersection (all-way signal/stop/yield control or pedestrian overpass).
- Pedestrian crossing volumes should meet one of the following conditions:
    - 20 pedestrians in an hour, or
    - 15 elderly, disabled and/or children in an hour, or
    - 60 pedestrians total for the highest consecutive pedestrian 4-hour period.

  Note: Pedestrian counts should only include pedestrians crossing within 100 feet either side of the proposed crosswalk location in an attempt to capture only potential users of the proposed crosswalk.
- The two-way traffic volume should meet the minimum of 1500 vehicles for the average daily traffic (ADT) or 150 vehicles in the pedestrian count hour.
- The current pedestrian crossing is not due to a correctable gap in the sidewalk system.

Crosswalks should not be installed at locations that could present an increased safety risk to pedestrians without first providing adequate design features and/or traffic control devices. “Adding crosswalks alone will not make crossings safer, nor will they increase vehicles stopping for pedestrians. Whether or not marked crosswalks are installed, it is important to consider other pedestrian facility enhancements (e.g., signing, raised median, traffic signal, roadway narrowing, enhanced overhead lighting, traffic-calming measures, curb extensions), as needed, to improve the safety of the crossing.” Good engineering judgment should be used in individual cases for deciding where to install crosswalks. (FHWA Publication #HRT-04-100)

After determination is made that a crosswalk is warranted exhibit 3.20 provides enhancements that should be added when a crosswalk at a midblock or an uncontrolled approach to an intersection is implemented. The enhancements contained in exhibit 3.20 are for guidance purposes and should be applied with engineering judgment. Major improvements, such as pedestrian hybrid beacons and pedestrian signals, must meet MUTCD guidelines and warrants; and be justified by an engineering study.

As an example, if it is determined that an uncontrolled/midblock crosswalk is warranted, review exhibit 3.20 for the given vehicle volume and roadway configuration to determine the number of the applicable SDDCTEA-developed drawing.

All drawings (14 total) have been included in exhibit 3.21 and exhibit 3.22.

Exhibit 3.20 Guidelines for Enhancements of Crosswalks at Midblock Locations and on Uncontrolled Approaches to Intersections

X = Required Treatment
√ = Recommended Treatment

	Vehicle Volume 1,500 ≤ ADT ≤ 12,000 OR 150 ≤ 1-Hour Volume ≤ 1,200												Vehicle Volume ADT > 12,000 OR 1-Hour Volume > 1,200											
	*2-Lanes Two-way			3-Lanes Two-way			≥ 4-Lanes Divided With Raised Median			≥ 4-Lanes Undivided			*2-Lanes Two-way			3-Lanes Two-way			≥ 4-Lanes Divided With Raised Median			≥ 4-Lanes Undivided		
Enhancement Type	≤ 30 mph	35 mph	≥ 40 mph	≤ 30 mph	35 mph	≥ 40 mph	≤ 30 mph	35 mph	≥ 40 mph	≤ 30 mph	35 mph	≥ 40 mph	≤ 30 mph	35 mph	≥ 40 mph	≤ 30 mph	35 mph	≥ 40 mph	≤ 30 mph	35 mph	≥ 40 mph	≤ 30 mph	35 mph	≥ 40 mph
Pavement Marking																								
Crosswalk Marking: Section 3B.18	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Added Visibility Crosswalk Marking: Section 3B.18, Para 13									√			√			√		√	√	√	√	√	√	√	√
Signing and Lighting																								
Pedestrian Crossing (W11-2) warning sign W/ Downward Diagonal Arrow (W16-7P) Plaque : Section 2C.50	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Yield Here To (Stop Here For) Pedestrians (R1-5, R1-5a, R1-5b, or R1-5c) signs with Yield (Stop) Line marking: Section 2B.11 & 3B.16 (Yield or Stop scenario is dictated by local state law)							√	√	√	√	√	√							√	√	√	√	√	√
An advance Pedestrian Crossing (W11-2) warning sign with Ahead (W16-9P) plaque: Section 2C.50			√			√			√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Lighting	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Midblock Drawing #	**1**	**1**	**2**	**3**	**3**	**4**	**3**	**3**	**4**	**4**	**4**	**4**	**2**	**2**	**2**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**
Uncontrolled Approach to Intersection Drawing #	**5**	**5**	**6**	**7**	**7**	**8**	**7**	**7**	**8**	**8**	**8**	**8**	**6**	**6**	**6**	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**
Major Improvements	*Traffic Engineering Study is required to determine applicability of Hybrid Beacons, Pedestrian Signals or a Pedestrian Overpass*																							
Pedestrian Actuated Signals (Section 4C.05) **Drawing # 9, 12** **OR** Pedestrian Hybrid Beacons (Section 4F.01) **Drawing # 10, 11, 13, 14** **OR** Pedestrian Overpass (based on ITE Design and Safety of Pedestrian Facilities Manual)			√			√			√			√	√	√	√	√	√	√	√	√	√	√	√	√
FHWA PUBLICATION: HRT-04-100 **	C	C	P	C	P	P	C	P	N	P	P	N	C	P	N	P	N	N	N	N	N	N	N	N

* **If the crossing is at an intersection that has a dedicated left and/or right turn lane, it is considered a multi-lane section and should follow drawing 7 or 8.**

** **The letters (C,P, or N) describe the baseline minimum enhancements for midblock crosswalks according to FHWA publication number HRT-04-100. SDDCTEA's recommendations contained in this table are based on this publication's minimum criteria.**

C = Candidate sites for marked crosswalks. Marked crosswalks must be installed carefully and selectively. Before installing new marked crosswalks, an engineering study is needed to determine whether the location is suitable for a marked crosswalk. For an engineering study, a site review may be sufficient at some locations, while a more in-depth study of pedestrian volume, vehicle speed, sight distance, vehicle mix, and other factors may be needed at other sites. It is recommended that a minimum utilization of 20 pedestrian crossings per peak hour (or 15 or more elderly and/or child pedestrians) be confirmed at a location before placing a high priority on the installation of a marked crosswalk alone.

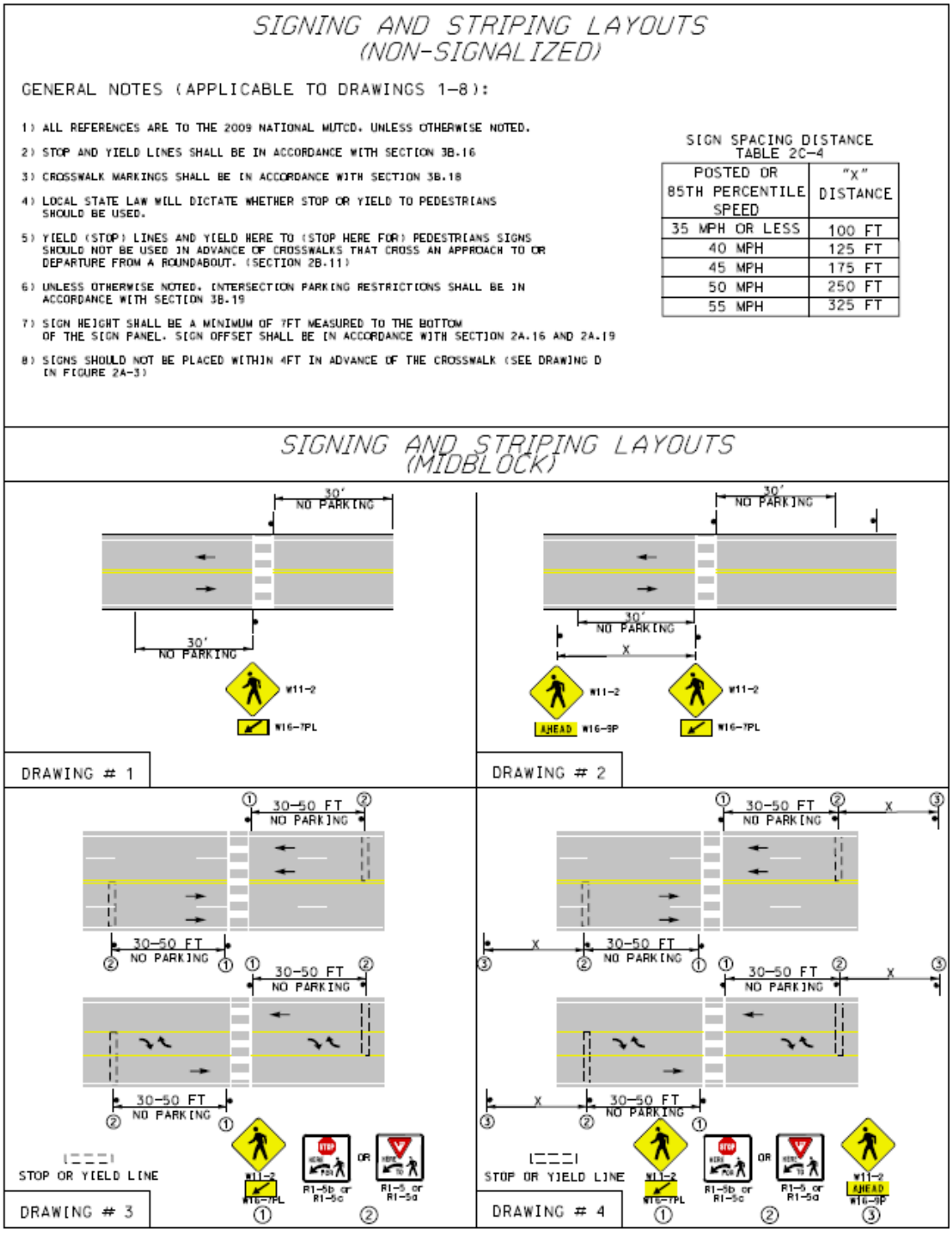
P = Possible increase in pedestrian crash risk may occur if crosswalks are added without other pedestrian facility enhancements. These locations should be closely monitored and enhanced with other pedestrian crossing improvements, if necessary, before adding a marked crosswalk.

N = Marked crosswalks alone are insufficient, since pedestrian crash risk may be increased by providing marked crosswalks alone. Consider using other treatments, such as traffic-calming treatments, traffic signals with pedestrian signals where warranted, or other substantial crossing improvement to improve crossing safety for pedestrians.

If the existing speed limit is > 40 mph and pedestrian signals/hybrid beacons are not warranted, consider reducing the roadway speed limit prior to placement of crosswalk.
Unless otherwise stated, all section references are to the 2009 National MUTCD

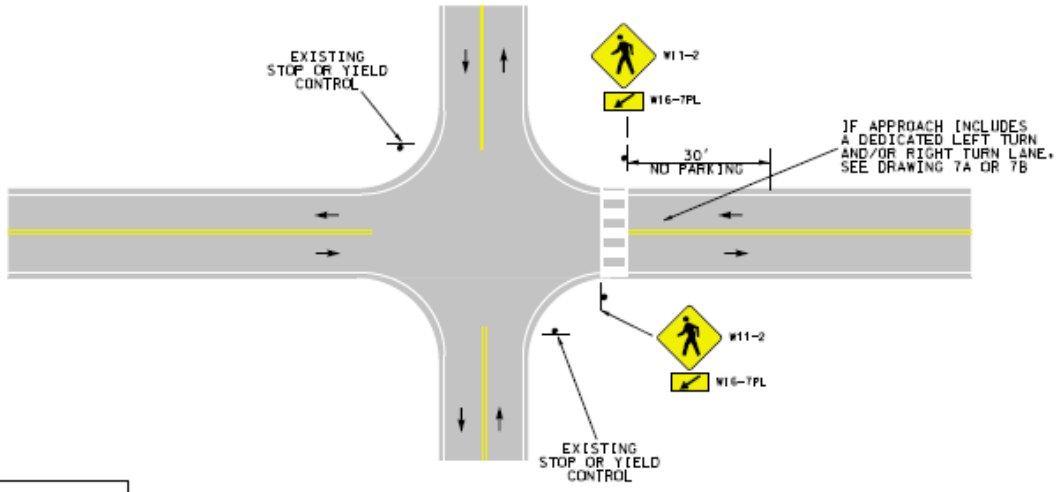
Speed Limit = Posted Speed Limit
ADT = Average Daily Traffic (total of both directions)

Exhibit 3.21 Uncontrolled Crossing Treatments for Pedestrian Activity



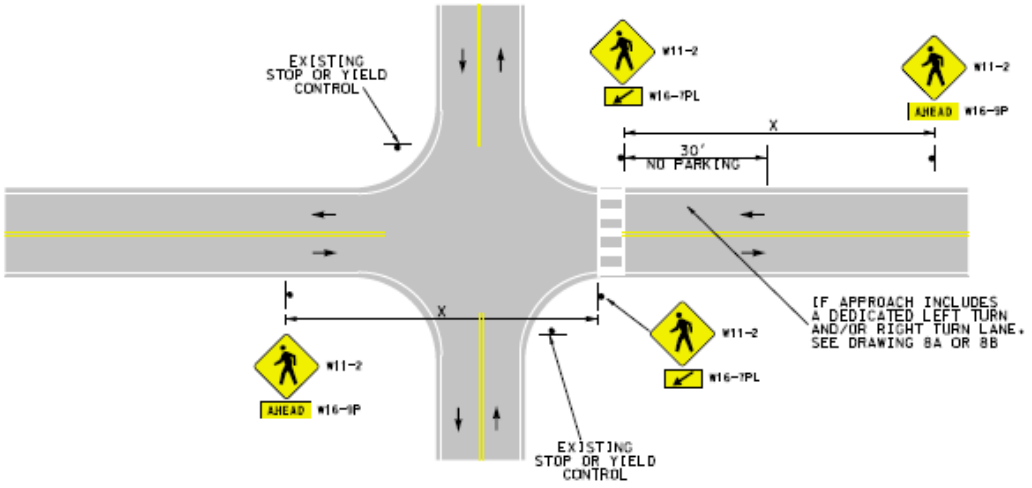
SIGNING AND STRIPING LAYOUTS (UNCONTROLLED APPROACHES TO INTERSECTIONS)

PEDESTRIAN CROSSING LAYOUT



DRAWING # 5

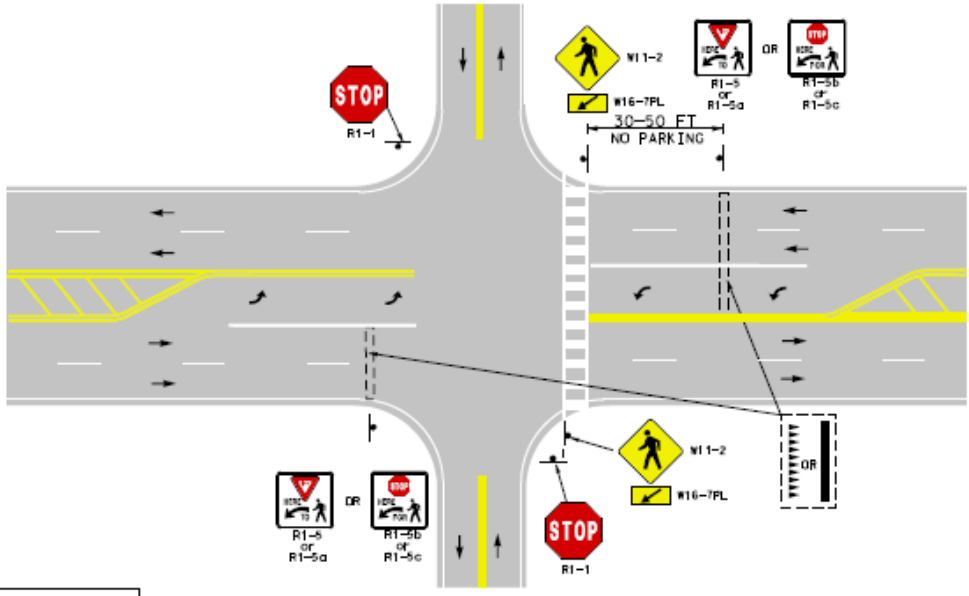
PEDESTRIAN AHEAD CROSSING LAYOUT



DRAWING # 6

SIGNING AND STRIPING LAYOUTS
(UNCONTROLLED APPROACHES TO INTERSECTIONS)

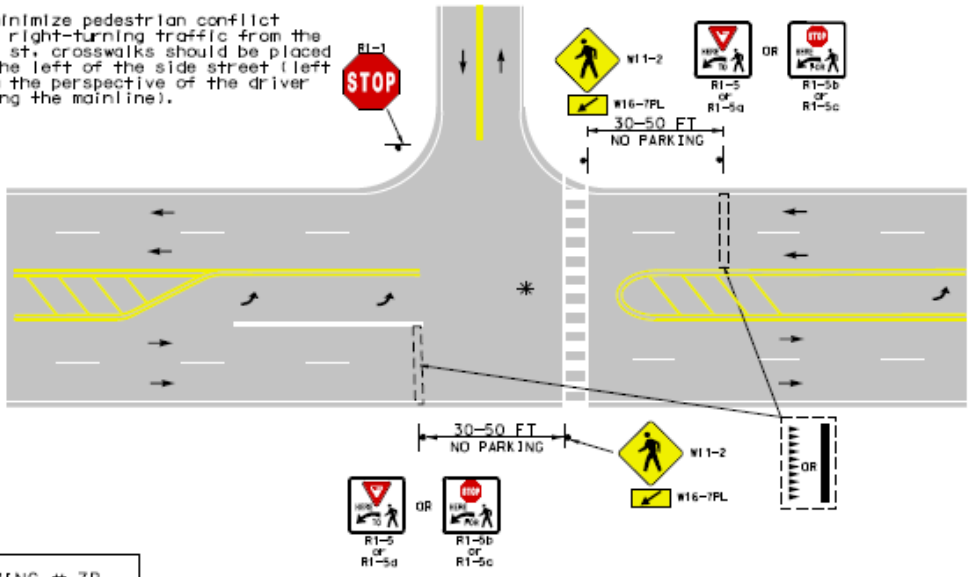
YIELD TO (STOP FOR) PEDESTRIANS CROSSING LAYOUT



DRAWING # 7A

YIELD TO (STOP FOR) PEDESTRIANS CROSSING LAYOUT

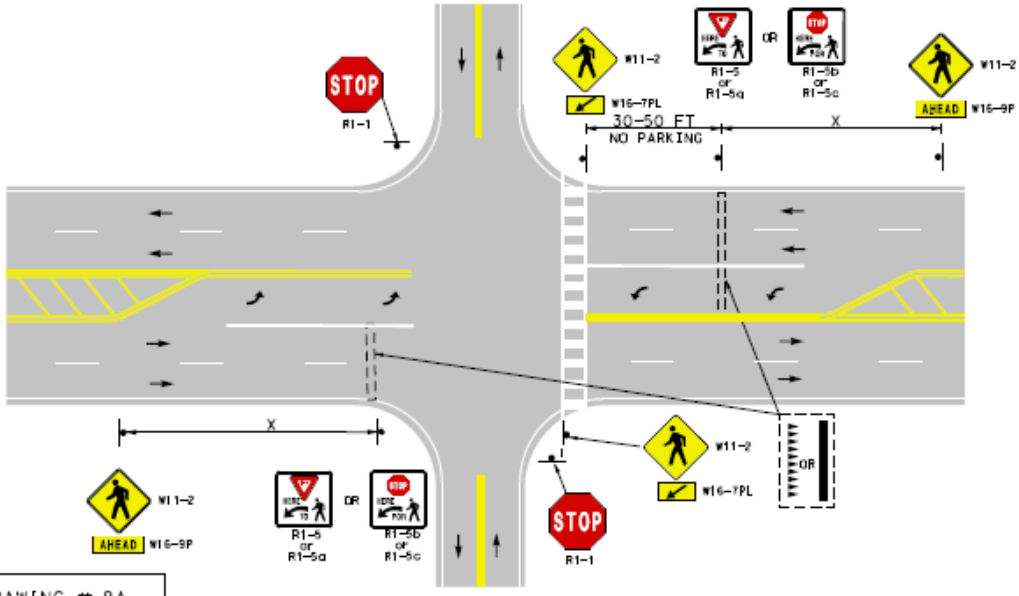
* To minimize pedestrian conflict with right-turning traffic from the side st. crosswalks should be placed to the left of the side street (left from the perspective of the driver facing the mainline).



DRAWING # 7B

SIGNING AND STRIPING LAYOUTS
(UNCONTROLLED APPROACHES TO INTERSECTIONS)

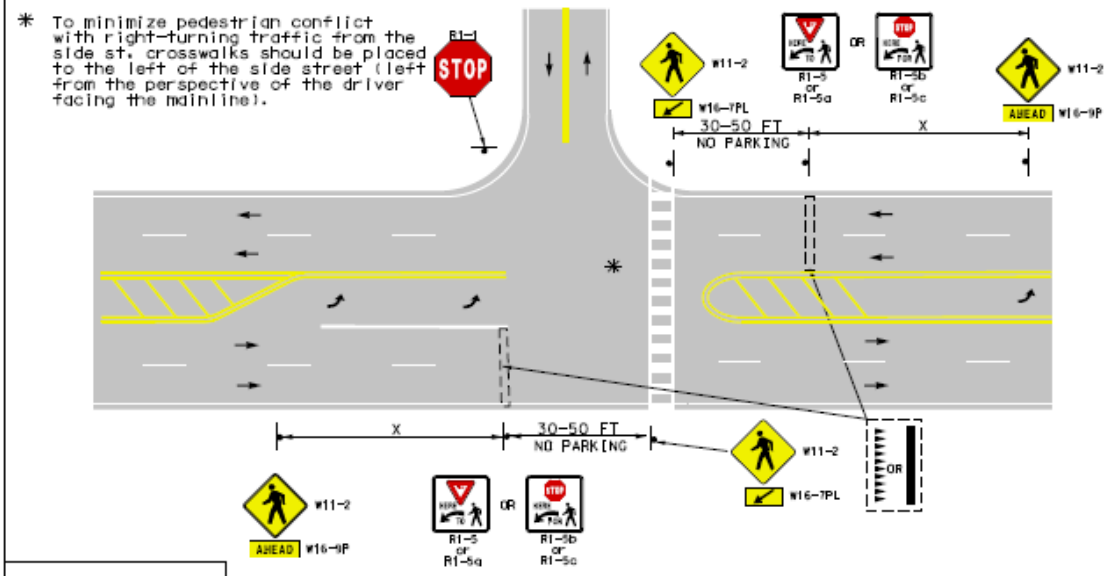
YIELD TO (STOP FOR) PEDESTRIANS CROSSING LAYOUT
WITH PEDESTRIAN AHEAD SIGN



DRAWING # 8A

YIELD TO (STOP FOR) PEDESTRIANS CROSSING LAYOUT
WITH PEDESTRIAN AHEAD SIGN

* To minimize pedestrian conflict with right-turning traffic from the side st. crosswalks should be placed to the left of the side street (left from the perspective of the driver facing the mainline).



DRAWING # 8B

Exhibit 3.22 Traffic Control Signal and Hybrid Beacon Crossing Treatments for Pedestrian Activity

TRAFFIC CONTROL SIGNAL AND PEDESTRIAN HYBRID BEACON LAYOUTS (MIDBLOCK AND UNCONTROLLED APPROACHES TO INTERSECTIONS)

GENERAL NOTES (APPLICABLE TO DRAWINGS 9–14):

1) ALL REFERENCES ARE TO THE 2009 NATIONAL MUTCD, UNLESS OTHERWISE NOTED.

2) PEDESTRIAN HYBRID BEACONS SHALL BE IN ACCORDANCE WITH WITH SECTION 4F.

3) MINIMUM WARRANTS AND GUIDELINES MUST BE MET PRIOR TO HYBRID BEACON AND TRAFFIC SIGNAL INSTALLATION – SEE SECTION 4F.01 FOR PEDESTRIAN HYBRID BEACON INSTALLATION GUIDELINES OR SECTION 4C.05 FOR THE PEDESTRIAN VOLUME SIGNAL WARRANT.

4) STOP AND YIELD LINES SHALL BE IN ACCORDANCE WITH SECTION 3B.16.

5) CROSSWALK MARKINGS SHALL BE IN ACCORDANCE WITH SECTION 3B.18.

6) CROSSWALKS SHALL NOT BE SIGNALIZED IF THEY ARE LOCATED WITHIN 300 FT FROM THE NEAREST TRAFFIC CONTROL SIGNAL, UNLESS THE PROPOSED TRAFFIC CONTROL SIGNAL WILL NOT RESTRICT THE PROGRESSIVE MOVEMENT OF TRAFFIC.(SECTION 4D.01).

7) THE "CROSSWALK – STOP ON RED (SYMBOLIC CIRCULAR RED)" (R10–23) SIGN SHALL BE USED WITH PEDESTRIAN HYBRID BEACONS. (SECTION 4F.02). IT SHALL NOT BE SUBSTITUTED WITH A PEDESTRIAN CROSSING (W11–2) WARNING SIGN.

8) THE "CROSSWALK – STOP ON RED (SYMBOLIC CIRCULAR RED)" (R10–23) SIGN SHALL ONLY BE USED WITH PEDESTRIAN HYBRID BEACONS. (SECTION 2B.53). IT SHALL NOT BE USED FOR OTHER APPLICATIONS.

9) IF A PEDESTRIAN HYBRID BEACON IS INSTALLED AT OR IMMEDIATELY ADJACENT TO AN INTERSECTION WITH A SIDE ROAD OR DRIVEWAY, VEHICULAR TRAFFIC ON THE SIDE ROAD OR DRIVEWAY SHALL BE CONTROLLED BY A STOP SIGN.

10) TRAFFIC CONTROL SIGNAL FEATURES: SUCH AS THE DESIGN/SIZE OF SIGNAL INDICATIONS, NUMBER/LOCATION OF SIGNAL FACES, AND SEQUENCING; SHALL BE IN ACCORDANCE WITH CHAPTER 4D.

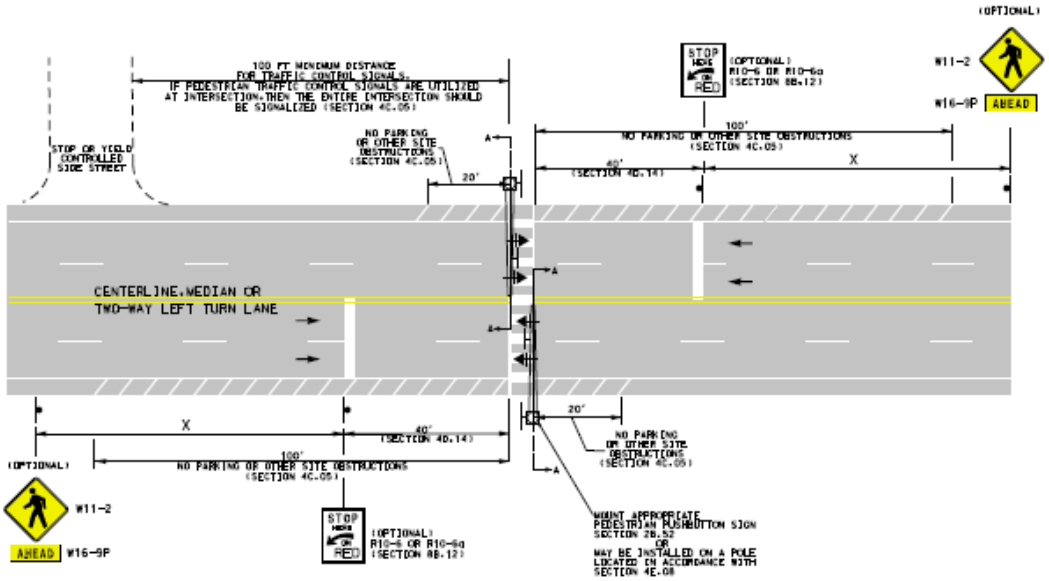
11) PEDESTRIAN SIGNAL HEADS AND DETECTORS SHALL COMPLY WITH CHAPTER 4E AND SECTION 4D.03 OR CHAPTER 4F FOR PEDESTRIAN HYBRID BEACONS.

12) UNLESS OTHERWISE NOTED, INTERSECTION PARKING RESTRICTIONS SHALL BE IN ACCORDANCE WITH SECTION 3B.19.

SIGN SPACING DISTANCE
TABLE 2C-4

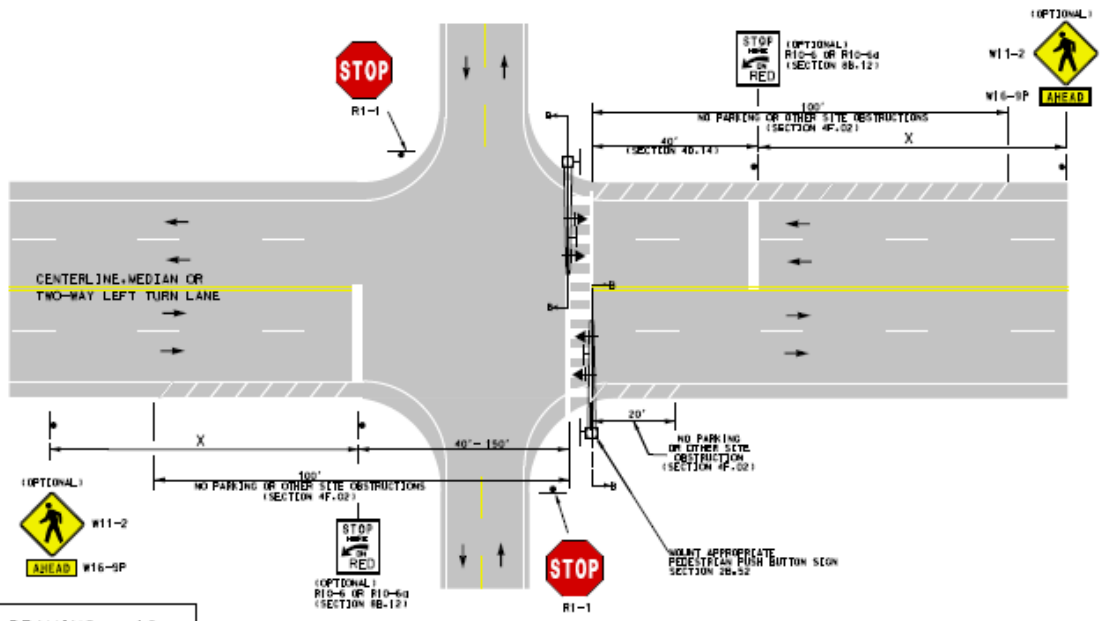
POSTED OR 85TH PERCENTILE SPEED	"X" DISTANCE
35 MPH OR LESS	100 FT
40 MPH	125 FT
45 MPH	175 FT
50 MPH	250 FT
55 MPH	325 FT

TRAFFIC CONTROL SIGNAL LAYOUT
(MIDBLOCK)



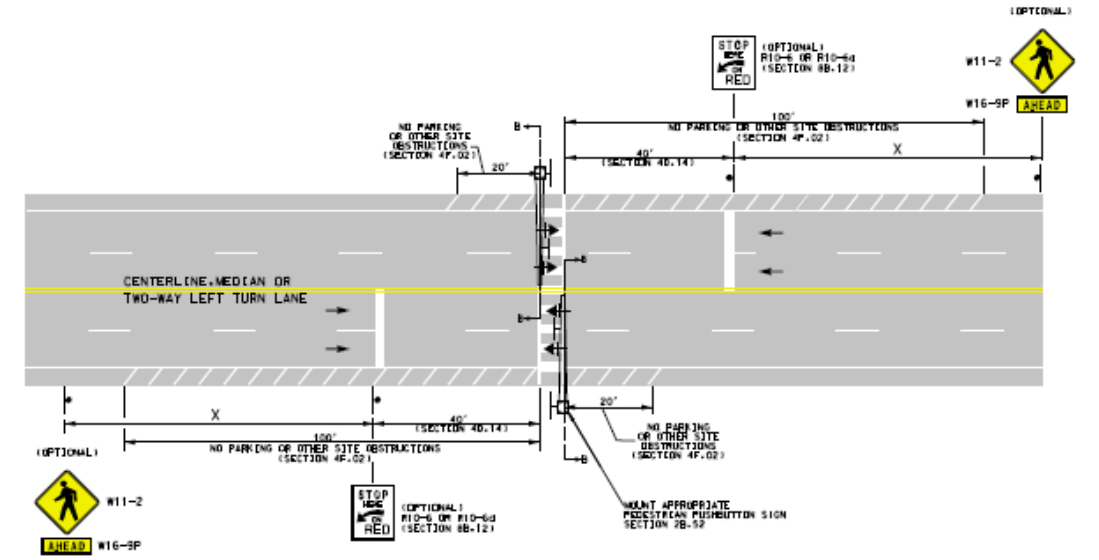
DRAWING # 9

PEDESTRIAN HYBRID BEACON LAYOUT
(UNCONTROLLED APPROACHES TO INTERSECTIONS)



DRAWING # 10

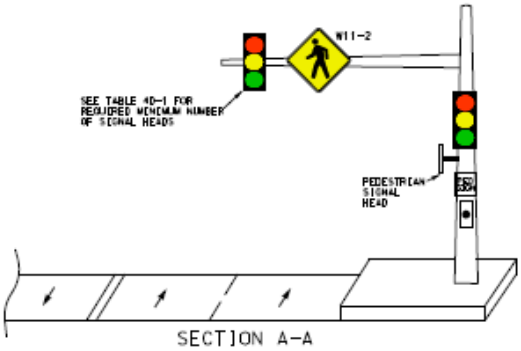
PEDESTRIAN HYBRID BEACON LAYOUT
(MIDBLOCK)



DRAWING # 11

TRAFFIC CONTROL SIGNAL AND PEDESTRIAN HYBRID BEACON LAYOUTS (CROSS SECTIONS)

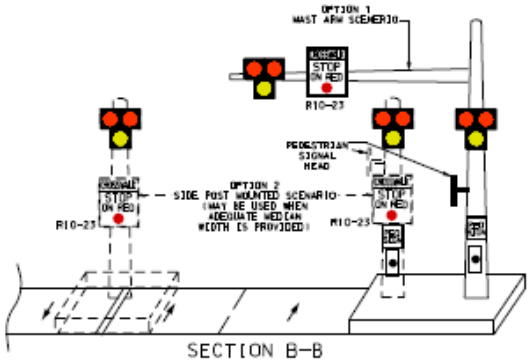
TRAFFIC CONTROL SIGNAL
APPLICABLE FOR ALL SPEEDS
(WITH OR WITHOUT MEDIAN)



SECTION A-A

DRAWING # 12

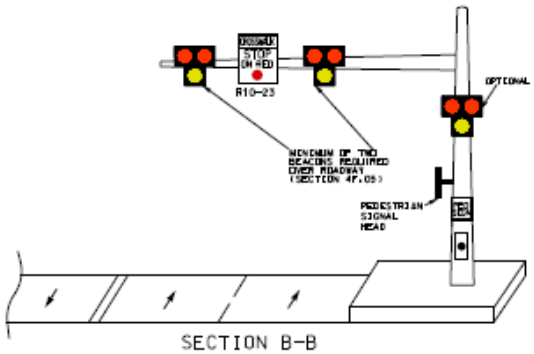
PEDESTRIAN HYBRID BEACON
SPEEDS ≤ 35MPH
(IF APPROACH LANES EQUAL 3 OR MORE PER DIRECTION, UTILIZE OPTION 1 - MAST ARM LAYOUT)



SECTION B-B

DRAWING # 13

PEDESTRIAN HYBRID BEACON
SPEEDS > 35MPH
(WITH OR WITHOUT MEDIAN)



SECTION B-B

DRAWING # 14

3.4.5. Additional Enhancements for Crosswalks at Midblock Locations and on Uncontrolled Approaches

The use of mid-block crosswalks is highly debated on military installations. Some proponents argue that marked mid-block crosswalks enhance safety while others argue that they give pedestrians a false sense of security. When developing plans for new facilities, avoid situations where the primary parking area is located on the opposite side of a busy street. Also, marking mid-block crosswalks at every location where pedestrians cross results in disrespect of crosswalks, including those that truly are warranted. Mid-block crosswalks should be consolidated as much as possible to limit areas where pedestrians may cross the roadway.

Uncontrolled crosswalks (i.e., at a midblock crossing or a crossing on an uncontrolled intersection approach) should be signed and/or signalized in accordance with the SDDCTEA developed drawings (14 total) as shown in exhibit 3.21 and exhibit 3.22.

Because pedestrian crossings on uncontrolled approaches and at mid-block locations are generally unexpected by the road user, a Pedestrian Crossing warning sign (W11-2) should be installed and adequate visibility should be provided by parking prohibitions. Corridors with several crossings can be signed at the start of the corridor to make motorists aware of pedestrian activity. In this case, it is useful to supplement the pedestrian crossing sign with a placard stating over what distance pedestrian activity takes place [i.e., AHEAD (W16-9P), XX FEET (W16-2P), or NEXT XX FEET (W16-4P)]. Finally, it is important to be consistent in sign placement.

However, vehicles must stop to allow pedestrians to cross the roadway within a marked crosswalk when a pedestrian is upon, or within one lane of the roadway on which the vehicle is traveling. The In-Street pedestrian crossing sign [i.e., YIELD TO PEDESTRIANS (R1-6) or STOP FOR PEDESTRIANS (R1-6a)] may be used to remind road users of laws regarding right-of-way at an unsignalized pedestrian crosswalk, and can be used in conjunction with the W11-2 warning sign. When used, this sign shall be placed in the roadway at the crosswalk location on the center line, on a lane line, or on a median island. **State Law is to yield to a pedestrian within a crosswalk.**

The In-Street Pedestrian Crossing sign shall not be post-mounted, or be located on the left-hand or right-hand side of the roadway. In general, this sign is intended to be used at midblock crosswalks and crosswalks on uncontrolled approaches to intersections. It is not to be used at STOP-controlled or signalized locations. The R1-6 or R1-6a signs are permitted in accordance with Section 2B.11 of the MUTCD and are recommended at:

1. Crosswalks with safety problems

2. Crosswalks where pedestrians have problems crossing
3. Midblock or unsignalized crossings
4. Where the width of pavement (excluding parking) is at least 20 feet
5. Where the posted speed limit does not exceed 35 mph.

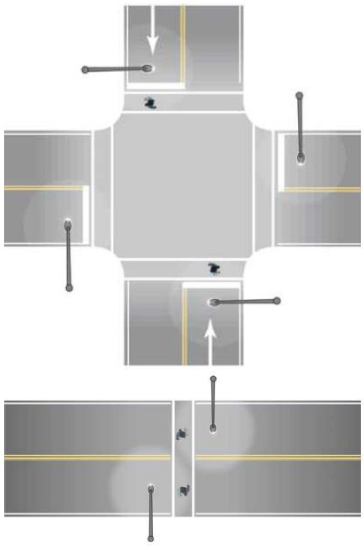
3.4.6. Intersection and Crosswalk Lighting

Intersection lighting increases motorist and pedestrian visibility and reduces crash potential. Although no specific warrants have been established, the MUTCD suggests roadway lighting if a disproportionate number of crashes occur at night. Lighting should be installed at those locations where a qualified lighting engineer has determined that lighting will contribute to the efficiency, safety, and/or comfort of motorists and pedestrians. Similar lighting can also be used at midblock pedestrian crosswalks and would be especially beneficial at busier crosswalks.

Most state DOTs, as well as IESNA, have developed criteria to assist in determining lighting requirements. When designing lighting, the following factors should be considered; luminaire type, light source type, wattage, mounting height, and pole location. A qualified lighting engineer should evaluate intersection lighting.

Lighting increases motorists and pedestrian visibility and reduces crash potential. In an effort to improve visibility of pedestrians, the preferred location of light standards for intersection and midblock crosswalks is illustrated below. The luminaire should be placed a minimum of 10-feet in advance of the crosswalk and be mounted 10 to 14-feet high. The purpose of this design is to locate the lighting in order to light the side of the pedestrian rather than the top of the pedestrian's head.

Recommended Location for Luminaires at Intersections and Midblock Locations



It is common to install luminaire arms for lighting on the top of traffic signal mast arms. These can be used with any type of mast arm application, to include traffic signal mast arms, mast arms for active vehicle barriers at access control points, mast arms used for advance overhead lane use control sign, and mast arms used for pedestrian hybrid beacons. The luminaire should be mounted at a height of 30 feet above the road surface, with a 15- foot arm. If a mast arm exists without lighting, luminaires should not be added because it likely was not structurally designed for the loading resulting from the luminaire arm.

In the absence of mast arms, lighting is often installed on utility poles, or on exclusive light poles. All poles, including signal mast arms, light poles, or utility poles should be located outside of the clear zone, shielded by a barrier, or be breakaway. Common mistakes include locating non-breakaway pole bases too close to the roadway, or setting the concrete foundation elevation too high such that it is a roadside hazard when struck by a vehicle, even if the pole base is breakaway. The luminaire itself should be located above the roadway itself, no farther than the edge of the roadway. For example, if the pole base is located 15 feet from the roadway, a 15-foot long luminaire arm is required to bring the luminaire back over the roadway.

LED, induction, high output compact fluorescent, or Metal Halide (MH) *[white or bluish-white light]* lamps are recommended over the High-Pressure Sodium (HPS) lamps that produce the amber light. The HPS lamps are commonly used for roadway lighting due to its high efficiency; however, for pedestrian lighting, the white light producing lamps are recommended due to its increased reflectivity off pedestrians and increased peripheral detection by drivers. The lamp chosen should provide a vertical illuminance level, measured 5-feet from the road surface, of 30 lux at intersection crosswalks and 20 lux minimum at uncontrolled crosswalks.

For continuous roadway lighting, light poles can be installed in continuous ruins parallel to the roadway. Continuous lighting should avoid shadowing effects from too wide of spacing. The conical shape of the lighted area from one luminaire should have a slight overlap with the lighted area of the next luminaire. The exact spacing can vary depending on the height and wattage of the luminaires. A lighting design using 200 watt luminaires with a mounting height of 40 feet should use a spacing of 225 feet.

It is also permissible to use in-roadway warning lights in a line parallel to the edges of the crosswalk, either at or within 10 feet of the near edge of the crosswalk. Installation of in-roadway warning lights must conform to Chapter 4N of the MUTCD, or the applicable state supplement to the MUTCD. In accordance with the MUTCD, in-roadway warning lights shall not be installed at crosswalks controlled by YIELD signs, STOP signs, or traffic control signals.

3.4.7. Federal Accessibility Compliance

The Americans with Disabilities Act of 1990 (ADA) is a major civil rights law that prohibits discrimination against persons with disabilities and sets design requirements for construction or alteration of facilities. It applies to state and local government and private sector facilities. The Department of Justice and Department of Transportation maintain standards under the ADA.

The Architectural Barriers Act of 1968 (ABA) requires that buildings and facilities that are designed, constructed, or altered with Federal funds, or leased by a Federal agency, comply with Federal standards for physical accessibility. The ABA applies to Federal facilities including those on military installations. The DoD maintains standards under the ABA.

Per the October 31, 2008 Deputy Secretary of Defense (DepSECDEF) Memo, Subject: Access for People with Disabilities, the DoD accessibility standards are based on the 2004 "Americans with Disabilities Act and Architectural Barriers Act Accessibility Guidelines" (ADA-ABA Guidelines) developed by the U.S. Access Board (http://www.access-board.gov/ada-aba/final.pdf). Specifically, DoD's adopted standards are included in ABA Chapters 1 and 2, and Chapters 3 through 10 of the guidelines, which specify what has to be accessible and how to achieve access. Although ABA are written as guidelines, the October 31, 2008 DepSECDEF Memo states that the ABA Guidelines are adopted by the DoD. Therefore, since DoD adopted the guidelines, they are now standards with which DoD must comply.

In an effort to address design elements found in public rights-of-way and not covered by the ADA and ABA guidelines, the United States Access Board published "Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way" (PROWAG) in July 2011 and provided a public comment period. SDDCTEA recommends that DoD installations utilize the PROWAG for transportation elements (such as sidewalks along roadways and parking lots), in addition to Unified Facilities Criteria (UFC) 3-201-01 Civil Engineering.

According to "Designing Sidewalks and Trails for Access" published by the FHWA, the type of provisions needed vary by location. Different types of curb ramps are needed at sidewalks and crosswalk locations. Detectable warning surfaces must also be provided at the road edge in order to give blind pedestrians the message that they are about to enter a roadway. The detectable warning surface must differ in color from the sidewalk, must be at least two feet deep measured parallel to the direction of the sidewalk, and should not be diagonal to the crosswalk.

In addition to the detectable warning surface, a turning space at least 4-foot by 4-foot intended for wheelchair mobility is to be provided at the top of the ramp. The maximum

cross-slope of this 'landing area' should be no greater than two percent. At signalized intersections where pedestrian push buttons are used, it must be located no greater than 10 inches from the landing area. Sometimes, in order to achieve this, pedestrian push button stub poles are needed. The pedestrian push button should be mounted at 42 inches from the elevation of the sidewalk. These features are illustrated in the photo below.

Pedestrian Accommodation Guidance and Costs:

- Install ADA curb ramps at all crosswalk locations where raised curbing is present.
- Upgrade all non-ADA curb ramps to ADA compliant ramps.
- Complete all missing sidewalk linkages.
- General cost information is as follows:
  - Estimated cost of a new sidewalk is $33/LF.
  - Estimated cost of a new curb ramp is $4,000 each.
  - Estimated cost of a new crosswalk is $225 each.
  - Estimated cost to replace only a sign is $21 per square foot of sign.
  - Estimated cost to replace only a post is $104 each.
  - Estimated cost to remove an old sign is $150 each.

3.5. ACP Design Criteria

3.5.1. Purpose of an ACP

ACPs ensure the proper level of access control for all DOD personnel, visitors, and truck traffic to an installation. The objective of an ACP is to secure the installation from unauthorized access and intercept contraband while maximizing vehicular traffic flow. Several components are required for an ACP to perform this function properly. The priorities of an ACP are:

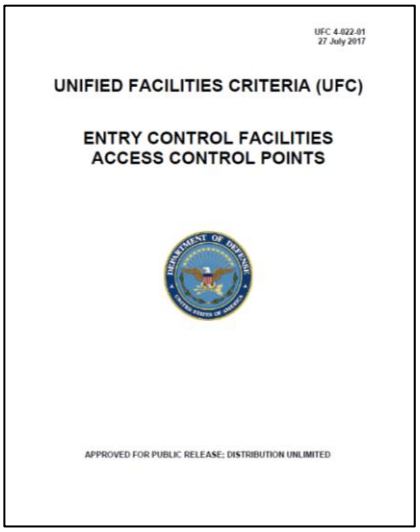
- Security – The first objective of an ACP is to maintain perimeter security and establish the demarcation line between the controlled and uncontrolled perimeter of the installation. An ACP must accommodate Random Anti-Terrorism Measures (RAM) and must be able to operate at all FPCONs protecting against illegal entry.
- Safety – Safety measures shall be incorporated so that persons and vehicles entering and leaving the facility do so in a safe and orderly manner to protect themselves, security personnel, and pedestrians from harm. Safety provisions for Security Forces includes personnel protection against attack and errant drivers as well as considerations for climate, location, and orientation.
- Capacity – The ACP needs to maximize the flow of traffic without compromising safety, security, or causing undue delays that may affect installation operations or off-installation public highway users.
- Sustainability – The ACP should reduce energy costs, facility maintenance and operations costs through sustainable design where appropriate.

3.5.2. Design References

The planning and design practices must ensure that ACPs meet performance requirements to contain possible threats while maintaining engineering design requirements for facilities and roads. These responsibilities often conflict and are why planning and design guidance continues to evolve.

Key ACP criteria and guidance utilized in the evaluation of ACPs include:

UFC 4-022-01 on Security Engineering: Entry Control Facilities/Access Control Points, 2017

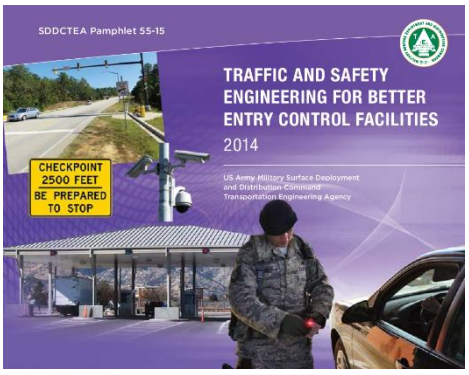


Initially, many branches of the military wrote their own policies for the design and construction of ACPs. In 2005, the *Unified Facilities Criteria (UFC) on Security Engineering: Entry Control Facilities/Access Control Points* (herein referred to as "the UFC") was released, and was updated in 2017. The UFC presents a unified approach between military service branches regarding the design features necessary to ensure that infrastructure constructed today will have the flexibility to support future technologies, a changing threat environment, and changes in operations. The UFC provides planning, design, construction, sustainment, restoration, and modernization criteria, and applies to the military departments, the defense agencies and DOD field activities.

Other UFCs that deal with security engineering include:

- 4-010-01 DoD Minimum Antiterrorism Standards for Buildings
- 4-020-01 Security Engineering: Facility Planning Manual
- 4-022-02 Security Engineering: Design and Selection of Active Vehicle Barriers
- 4-022-03 Security Fences and Gates
- 3-530-01 Design: Interior, Exterior Lighting, Security Lighting, and Controls

SDDCTEA Traffic and Safety Engineering for Better Entry Control Facilities, 2014



This pamphlet provides transportation and safety engineering guidance necessary to plan and design an ACP, which is capable of providing the security level desired while minimizing disruptions to the ingress and egress of the installation. The pamphlet is intended to supplement other existing criteria and guidance. Specific focus areas include: Alternative Analysis, Traffic Engineering Studies, Geometric Design, Facility Considerations, Traffic Control, Lighting, Force Protection, Intelligent Transportation Systems, Vehicle Characteristics, Automated Processing, Pedestrian Considerations, Speed Management, and Interim ACP Solutions.

Other Design Considerations

Since ACPs serve public motorists, national and local design guidelines must also be considered. Geometric design features must adhere to American Association of State Highway and Transportation Officials (AASHTO), *A Policy on Geometric Design of Highways and Streets 2011*, and *Roadside Design Guide 2011*.
Traffic control devices including signs, signals, and pavement markings associated with active vehicle barriers (AVBs) must adhere to the *Manual on Uniform Traffic Control Devices* (MUTCD 2009 with 2012 revisions) and the DOD Supplement to the MUTCD. Special traffic controls must be approved by SDDCTEA.

3.6. Design Element Considerations

3.6.1. ACP Functions

An ACP can have many functions and not all functions are required at every ACP. The basic ACP functions are:

(a) Visitor Processing
(b) Vehicle Registration
(c) ID Check
(d) Privately Owned Vehicle (POV) Inspection
(e) Truck Inspection

Functions for each ACP are based on the installation's mission, antiterrorism plan, ACP use classification, and land area. Functions may change to meet the demands of higher FPCON levels.

When an installation has a limited number of access points, functional requirements may need to be combined at the ACP. For example, an installation with only one ACP may combine functions, or may use a centralized truck inspection facility that is separate from the ACPs or the installation. A large installation may designate one ACP for truck inspection and truck access only. Not requiring support for all functions at each ACP will reduce the infrastructure requirements.

UFC 4-022-01 illustrates functional relationships for three different types of ACPs/ACPs:

- Condition 1 – POV ACP with visitor processing
- Condition 2 – POV ACP without visitor processing
- Condition 3 – Commercial Vehicle ACP

The functional diagrams are shown in the following exhibits and illustrate general relationships and desired adjacencies for each condition.

Exhibit 3.23 UFC Functional Relationships – Condition 1

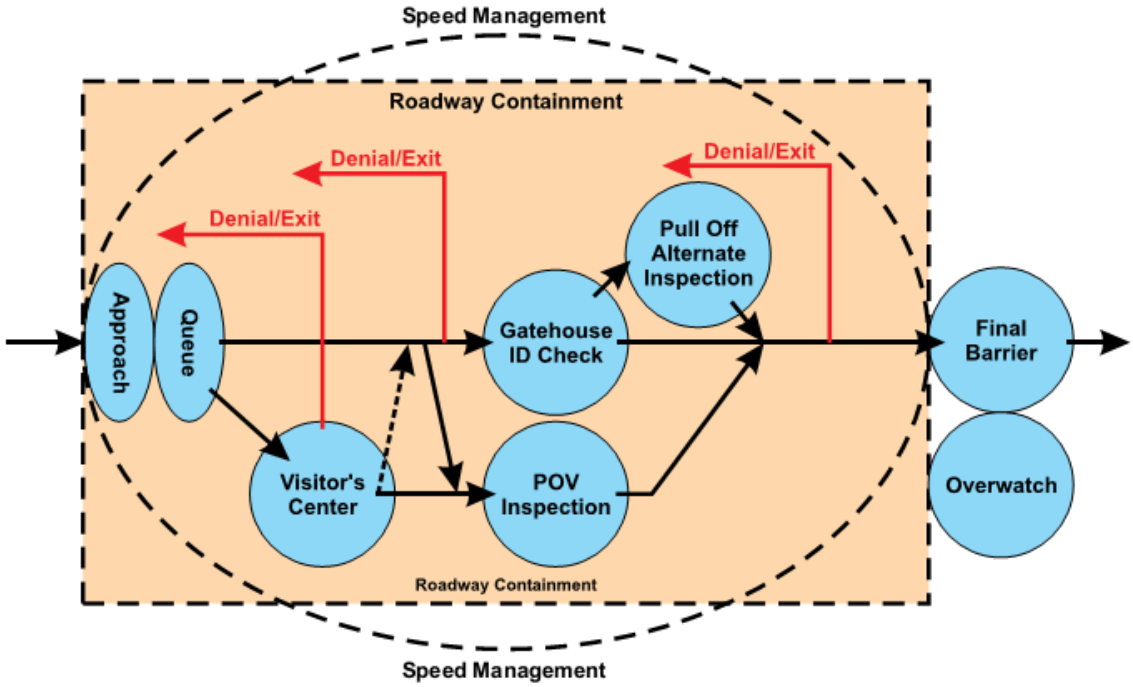


Exhibit 3.24 UFC Functional Relationships – Condition 2

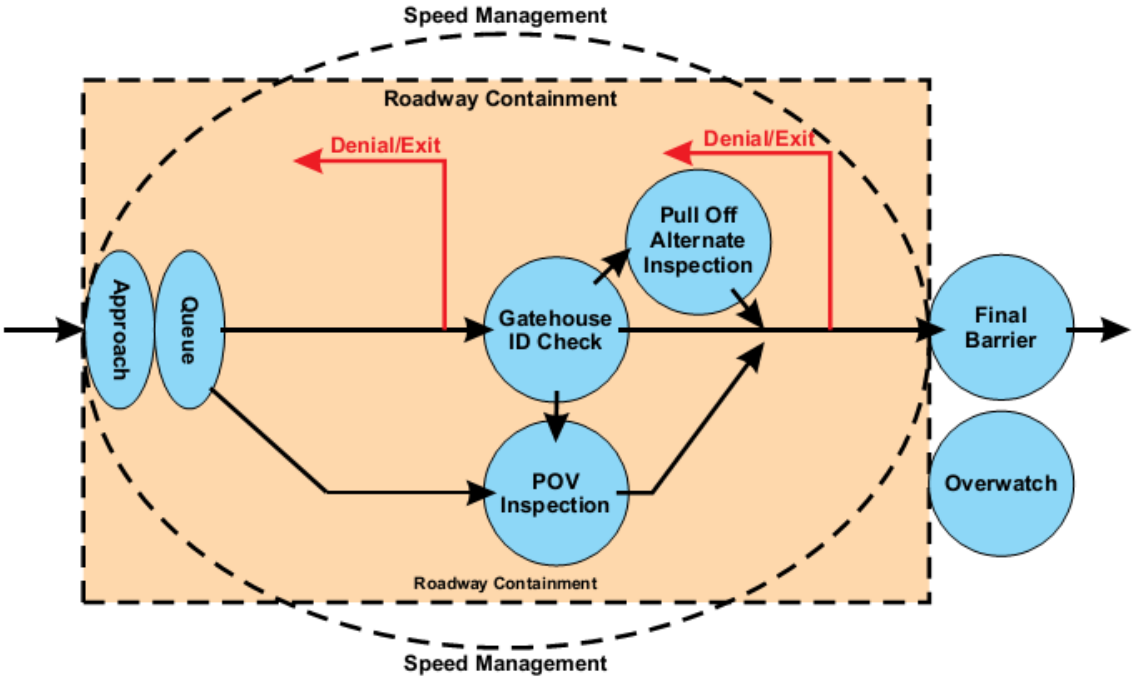
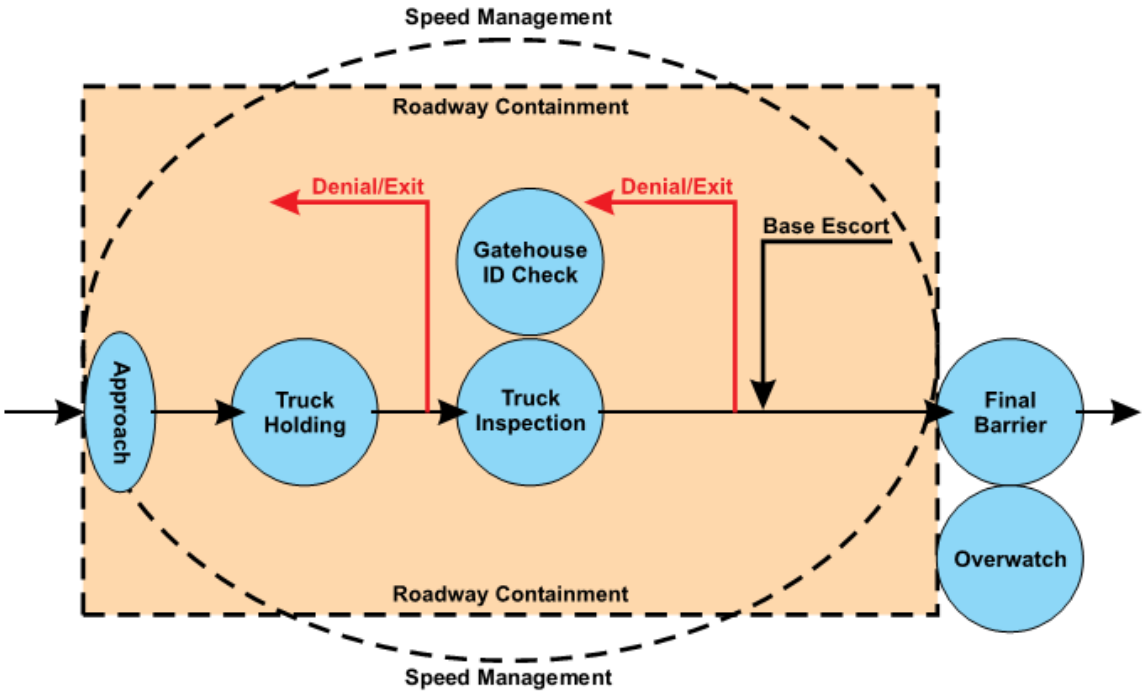


Exhibit 3.25 UFC Functional Relationships – Condition 3



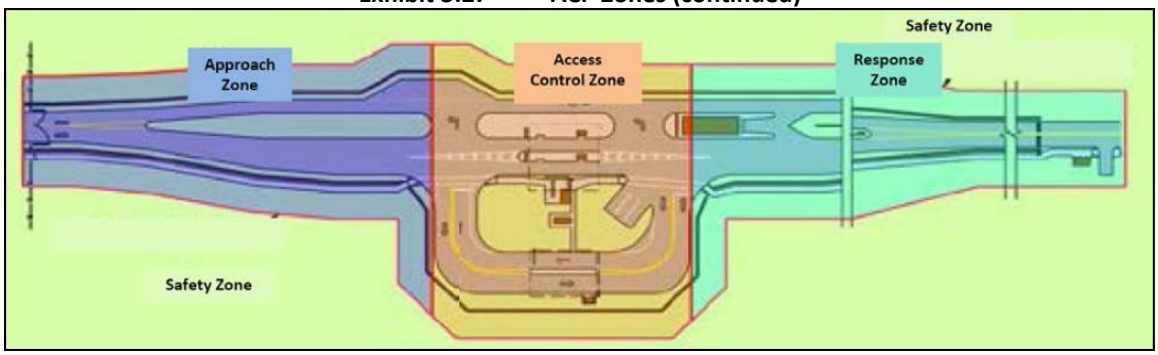
3.6.2. ACP Zones

An ACP consists of four zones, each encompassing specific functions and operations. Beginning at the installation property boundary, the zones include the safety zone, approach zone, access control zone, and response zone.

Exhibit 3.26 ACP Zones

Zone	Location	Goals
Safety	Extends in all directions beyond passive and active barriers.	Protect assets and personnel from explosions.
Approach	Installation boundary to a point just before the ID checkpoint.	Reduce speed, sort vehicles, provide stacking room and identify potential threats.
Access Control	A point just before and after the ID checkpoint.	Identify vehicles and personnel; provide surveillance, random inspection, visitor processing, and rejection capabilities.
Response	A point just after the ID checkpoint to the AVBs.	Provide measures to react to and resist a threat.

Exhibit 3.27 ACP Zones (continued)



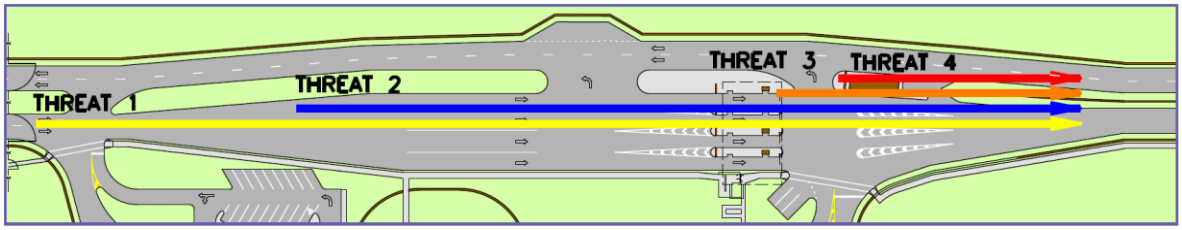
3.6.3. AVB Placement

The UFC defines four threat scenarios that must be considered – one high-speed threat and three covert threats. If advance speed detection is used in the approach zone of an ACP, then another high-speed threat must be considered. The four threats are described below:

- **Vehicle Threat Scenario #1.** Threat vehicle enters the ACP in the inbound or outbound lane(s) at the maximum speed attainable at the ACP entrance and then immediately accelerates through the ACP. Army policy sets the maximum acceleration rate of a threat vehicle at 11.3 f/s^2.
- **Vehicle Threat Scenario #2.** Threat vehicle enters the ACP in the inbound or outbound lane(s) at or under the posted ACP speed limit and then, later at some point farther in the Approach Zone, accelerates at its maximum acceleration rate through the rest of the ACP. This threat scenario will only apply when advance speed detection is used, and a vehicle starts accelerating after a detector that would otherwise detect a vehicle in Threat Scenario 1.
- **Vehicle Threat Scenario #3.** Threat vehicle attempts to covertly enter the ACP, but is detected and denied entry by guards at the ID Check Area. Vehicle driver then defies guards and accelerates through the rest of the ACP at the vehicle's maximum acceleration rate.
- **Vehicle Threat Scenario #4.** Similar to Threat Scenario 3 above, except the driver of the denied vehicle drives toward the turn-around or Search Area at the ACP Speed Limit (25 mph) as if complying with guard instructions, but then fails to turn and instead accelerates at its maximum acceleration rate through the rest of the ACP.

These threat scenarios are illustrated in exhibit 3.28.

Exhibit 3.28 General ACP Threat Scenarios



3.6.3.1. Threat Containment and the Role of AVBs

Installations are required to adhere to either the *Army Standard for ACPs* (applicable to Army installations only) or the UFC 4-022-01 *Security Engineering: Entry Control Facilities/Access Control Points* (applicable to all installations). Active vehicle barriers at the end of the threat response zone are a mechanism to provide containment if the ACP's security is compromised by a potential threat. There are many different types of AVBs and the barrier rating is dependent on service requirements and installation needs. Active vehicle barriers should be designed with a safety scheme that allows all road users to safely clear the barrier or stop in advance of it prior to deployment.

The location of AVBs is dependent on the length of the response zone. The minimum length of the response zone is calculated based on:

- **Velocity** and location of the threat vehicle when it is detected
- Rate of threat vehicle **acceleration**
- **Guard Response, safety, and deployment times**

3.6.3.2. Safety and the Manual on Uniform Traffic Control Devices (MUTCD)

Multi-service Regulation (AR 55-80, OPNAVINST 11210.2, AFMAN 32-1017, MCO 11210.2D, and DLAR 4500.19) on the Department of Defense (DOD) Transportation Engineering Program identifies in Section 3-11 the Military's Highway Safety Program requirements:

- Under General, "This section prescribes the policies and procedures related to DOD highway safety needs. It implements 23 USC 402, DODD 4510.11, and DODI 6055.4."
- Under General, "This regulation applies to all military installations and activity sites that have streets and/or parking facilities, and a workforce of 1,000 or more personnel."
- Under Policies, "Installation commanders will develop and maintain their roadways to nationally accepted standards that provide a safe driving environment for all drivers and passengers."

- Under Traffic Control Device Plan, "This plan provides for the periodic review of existing traffic control devices and the systematic replacement of substandard and deteriorated devices. All installation traffic signals, signs, and pavement markings will be in substantial conformance to FHWA's Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) (http://mutcd.fhwa.dot.gov). Variances in the design and application of installation traffic control devices from the standards contained in MUTCD must be approved by MTMC (now SDDC) and FHWA."

Other supporting regulations include:

- DODD 4510.11 on DOD Transportation Engineering
- DODD 4715.1 on Environmental Security
- DODI 6055.4 on DOD Traffic Safety Program

In order to satisfy the necessary safety requirements in deploying AVBs, **AVBs must be designed, implemented and operated in accordance with the Federal Highway Administration's (FHWA),** ***Manual on Uniform Traffic Control Devices***. Thus, AVB safety requirements include providing indication to road users of AVB activation and providing sufficient clearance time for road users to clear or stop prior to AVB deployment. When considering AVB designs and locations, the total response time must be considered and achieved. Following lists the minimum response times required for select SDDCTEA-approved AVB Safety Schemes:

- Conventional Traffic and Safety Control System for AVBs or AVB System Staggered at an Intersection
  - Guard reaction = 3 seconds minimum
  - Time for safety and traffic signalization = 4 seconds minimum
  - Deployment time = 2 seconds minimum
  - **TOTAL = 9 seconds minimum**
- High Efficiency Presence Detection System
  - Guard reaction = 3 seconds minimum
  - Time for safety and traffic signalization = 2 seconds minimum
  - Deployment time = 2 seconds minimum
  - **TOTAL = 7 seconds minimum**
- Stop Control Scheme
  - Guard reaction = 3 seconds minimum
  - Deployment time = 2 seconds minimum
  - **TOTAL = 5 seconds minimum**

For the Conventional AVB Traffic and Safety Control or AVB System Staggered at an Intersection, the four seconds minimum safety time includes the time for traffic control signals to sequence to alert motorists of pending AVB deployment. Signals must provide

time for motorists approaching the barrier to either pass over it or safely stop in front of it. In addition, at 25 mph (40 km/h), 150 feet (45.7 meters) of wet stopping sight distance is needed for a driver to react and stop the vehicle. If a vehicle is 110 to 149 feet (33.5 to 45.4 meters) from the barrier, it will take the driver 4 seconds to safely traverse the barrier since it must be assumed that the driver cannot safely stop the vehicle. This time may be more dependent on operational procedures and site conditions such as grade.

Note that for Threat Scenario 4, only 1 second is required for guard reaction. If a vehicle were denied entry, either in an ID check lane or an inspection area, a guard would be watching the vehicle to verify that they turn around. Therefore, the guard would not need as much reaction time.

3.6.3.3. Calculating the Response Zone Length

The determination of the response zone length requirements must consider the various type(s) of threat scenarios, the means of detection, the initial velocity and the acceleration of the threat vehicle. The UFC as well as most service branches have specific guidance on these calculations. Ultimately, the calculated response zone requirement should be considered a minimum and should be maximized whenever feasible to further ensure threat containment and road user safety.

The response zone length calculation may be the most critical calculation made when developing an ACP since threat containment and road user safety are of paramount importance. The designs presented within use preliminary response zone length calculations. These should be verified as the design of an ACP progresses. If a high speed attack can be detected through manual or automated means in the approach zone, the response zone (on straight alignments) may still need to exceed 670 feet to accommodate covert threats (assuming acceleration of 11.3 ft/sec^2 and initial velocity of 35 mph) and to accommodate guard response and safe barrier deployment. If there is no advance detection (speed, wrong-way, etc.) to alert of high speed threats, the response zone lengths may need to be significantly longer to accommodate high speed threats.

In general, treat calculated response as minimums such that both security and safety can be better addressed. Where reasonable and practical, locate AVBs at a site that makes the implementation of security and safety devices more practical. When barriers are located at the first major intersection, integrate AVBs preemption design with the intersection traffic control. Ultimately, the placement of AVBs requires:

- Calculation of minimum response zone lengths based on specific threat scenarios
- Extra distance when practical and feasible
- Site assessments to determine the feasibility of placement
- Coordination with traffic control devices and nearby intersections

Note that when planning a new ACP, it is preferred to include some form of curvature in the response zone to physically limit speeds through the ACP. Speed detection is prone to false positive calls. Therefore, response zone curvature can offer an increased degree of reliability with ACP security. Advance speed detection is frequently the most viable alternative when retrofitting barriers to existing ACPs or designing an ACP in a developed area.

The UFC 4-022-01 discusses active barrier placement methodologies and provides the variables used for barrier design scenarios. Long-term conceptual designs presented later in this section show active vehicle barriers. The location of the barriers is based on the required response zone lengths calculated for each design.

3.6.4. Required Traffic Safety Control System for AVBs

Traffic control devices associated with AVBs allow for quick response to a potential threat while protecting innocent ACP users in the area. Before any AVBs are installed, it is required that the chosen safety scheme be approved by SDDCTEA (if not a previously approved scheme).

3.6.4.1 Conventional Traffic and Safety Control System for AVBs

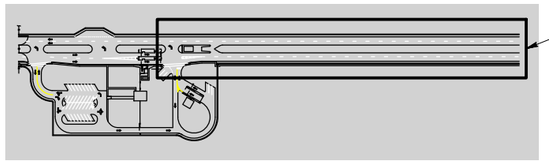
The conventional traffic and safety control system for AVBs is in exhibit 3.29 which can be found in the SDDCTEA 55-15 Pamphlet.

Proper signing and delineation are required on the approach to the AVBs for the inbound and outbound lanes.

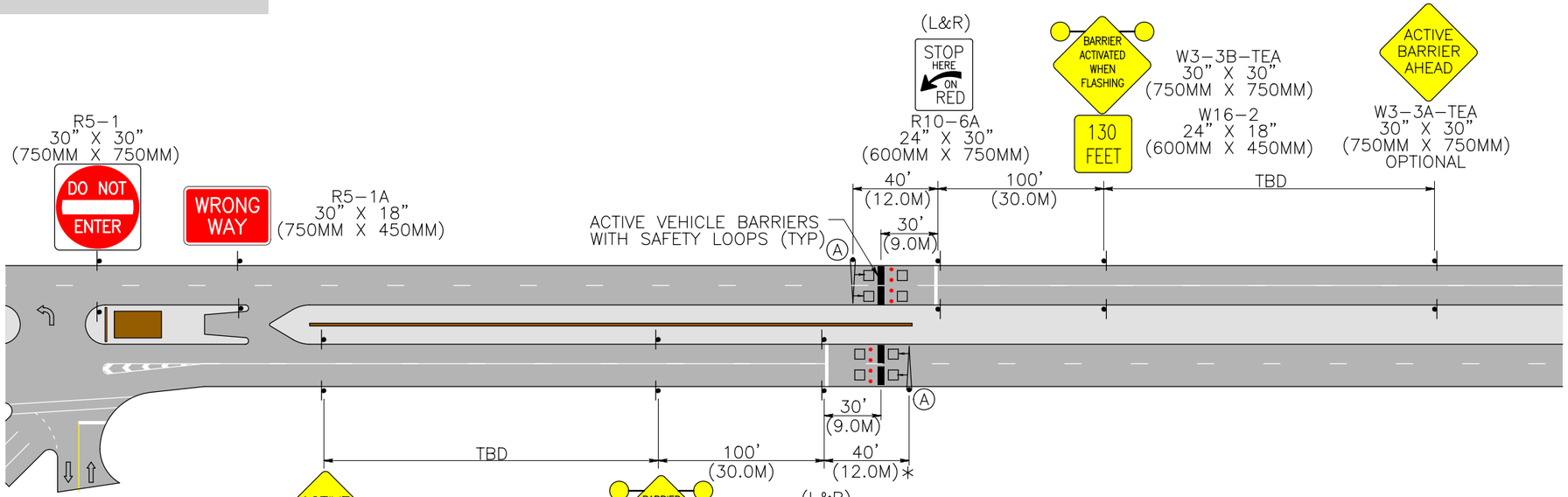
- A mast arm assembly with minimum two signal heads mounted on the mast arm, with an optional third signal on the pole, a modified R10-13 sign (BARRIER SIGNAL), and a luminaire must be provided at the active vehicle barrier device.
- The signal heads at the active vehicle barrier must always be 12-inch hybrid emergency signals or 12-inch red/yellow/green signals.
- Hybrid signals shall remain dark until the EFO sequence has been initiated. Once the barrier initiation sequence has been started, the hybrid signals flash yellow for 1 second, then change to steady yellow for 3 seconds, followed by the alternating flashing red signal indications as the barrier activates.
- Standard signals shall remain solid green until the EFO sequence has been initiated, the solid green signal indication then changes to a solid yellow signal for 3 seconds, followed by a solid red indication. The barrier begins to deploy 1 second after the signal turns red.
- A R10-6A sign (STOP HERE ON RED) must be installed 40 feet prior to the mast arm assembly.

- A W3-3B sign (BARRIER ACTIVATED WHEN FLASHING) supplemented by a W16-2 (XX FEET) and two flashing yellow beacons must be installed a minimum of 140 feet prior to the mast arm. The 140 feet minimum is applicable for 25 mph only, if a higher speed limit is utilized through the response zone refer to the MUTCD for sign placement.
- A W3-3C sign (ACTIVE BARRIER AHEAD) sign may be installed in advance at a location determined by a qualified traffic engineer.

AVB deployment should be triggered through programmable logic associated with a traffic signal controller. In other words, barrier controls should use the same type of safety and signaling that is used with traffic signals, to include phase sequence and clearance intervals.



BARRIER ACTIVATION SIGNING DETAIL



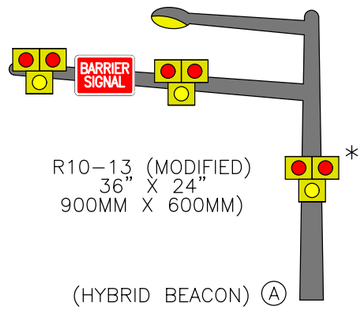
NOTES:

– SHALL HAVE TWO HYBRID BEACONS OR TWO STANDARD R/Y/G TRAFFIC SIGNALS PER APPROACH, ONE OVERHEAD INDICATION PER TRAVEL LANE.

* OPTIONAL HYBRID BEACON OR STANDARD R/Y/G TRAFFIC SIGNAL ON THE POST.

BARRIER ACTIVATION SIGNING DETAIL

	OPERATIONAL SEQUENCING FOR EMERGENCY FAST OPERATION (MIN FOR SAFETY – 25 MPH (40KPH) DESIGN SPEED)											
	TRAFFIC CONTROL	–	1	2	3	4	5	6	7	8	9	10
		NORMAL OPS	GUARD PERCEPTION AND REACTION TIME TO THREAT (EFO BUTTON)			YELLOW CHANGE (MUTCD MINIMUM)			ALL RED SAFETY	DEPLOYING BARRIER		THREAT CONTAINED
CONVERNTIONAL TRAFFIC SAFETY CONTROL SYSTEM	WARNING SIGN WITH BEACONS	DARK	DARK	DARK	DARK	ALT FY	ALT FY	ALT FY	ALT FY	ALT FY	ALT FY	ALT FY
	HYBRID BEACON	DARK	DARK	DARK	DARK	FLASHING YELLOW	STEADY YELLOW	STEADY YELLOW	STEADY YELLOW	ALT FR	ALT FR	ALT FR
	TRAFFIC SIGNAL	G	G	G	G	Y	Y	Y	R	R	R	R
	IN–ROADWAY LIGHTS OR ON BARRIER	DARK	DARK	DARK	DARK	DARK	DARK	DARK	FR	FR	FR	FR
	ACTIVE VEHICLE BARRIER	DOWN	DOWN	DOWN	DOWN	DOWN	DOWN	DOWN	DOWN	ACTIVATED	ACTIVATED	DEPLOYED



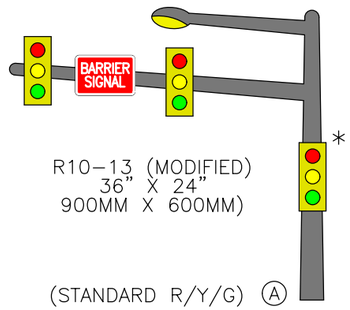


EXHIBIT 3.29

CONVENTIONAL TRAFFIC AND SAFETY CONTROL SYSTEM FOR ACTIVE VEHICLE BARRIERS

3.6.4.2 AVB System Collocated or Staggered at an Intersection

If necessary, AVBs could be collocated or staggered at downstream intersections if the inbound traffic queue from the intersection extends through the proposed AVB location or the proposed AVB location is too close to the intersection for outbound traffic to stop safely after traversing the intersection. The two options for an alternate AVB system are discussed below:

Conventional Signs and Signals Collocated at an Intersection Safety Scheme (exhibit 3.30 and exhibit 3.31): This safety scheme shall be used when the barrier is located within 300 feet of an intersection, and both the inbound and outbound barriers are relocated to the intersection. With this scheme, the barrier operates similarly to the conventional scheme, but the entire intersection is signalized and those signals which are green will cycle to red (red signals will remain red) when the barrier is activated. The total response time is greater than 9 seconds, necessitated by greater safety time due to the increased width between outbound stop line and barrier versus the conventional scheme.

Conventional Signs and Signals Staggered at an Intersection Safety Scheme (exhibit 3.32 and exhibit 3.33): With this safety scheme, the inbound barriers are located at an intersection and the outbound barriers are located 200 feet from the intersection. With this configuration, 9 seconds of travel time for barrier activation must be provided, similar to the conventional system. This scheme could employ other strategies such as wrong-way speed detection, or alternate geometry and travel paths to limit threat vehicle speeds. For more information refer to SDDCTEA Pamphlet 55-15.

NOTES

GENERAL:

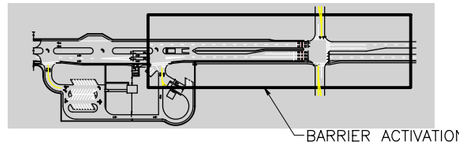
1. FINAL DESIGN AND OPERATIONAL ANALYSES IN ACCORDANCE WITH THE MUTCD AND TO BE PERFORMED BY A QUALIFIED TRAFFIC ENGINEER. PLANS FOR AVB SYSTEMS AT SIGNALIZED INTERSECTIONS SHALL BE REVIEWED BY SDDCTEA.
2. FINAL YELLOW AND RED CLEARANCE INTERVALS TO BE CALCULATED IN ACCORDANCE WITH THE MUTCD.
3. PEDESTRIAN CROSSINGS ARE PERMITTED ON ALL APPROACHES EXCEPT THE APPROACH WITH THE AVBS ITSELF.
4. ALL VEHICULAR MOVEMENTS ARE STOPPED ONCE AVBS ARE DEPLOYED.

SIGNALS AND SIGNS

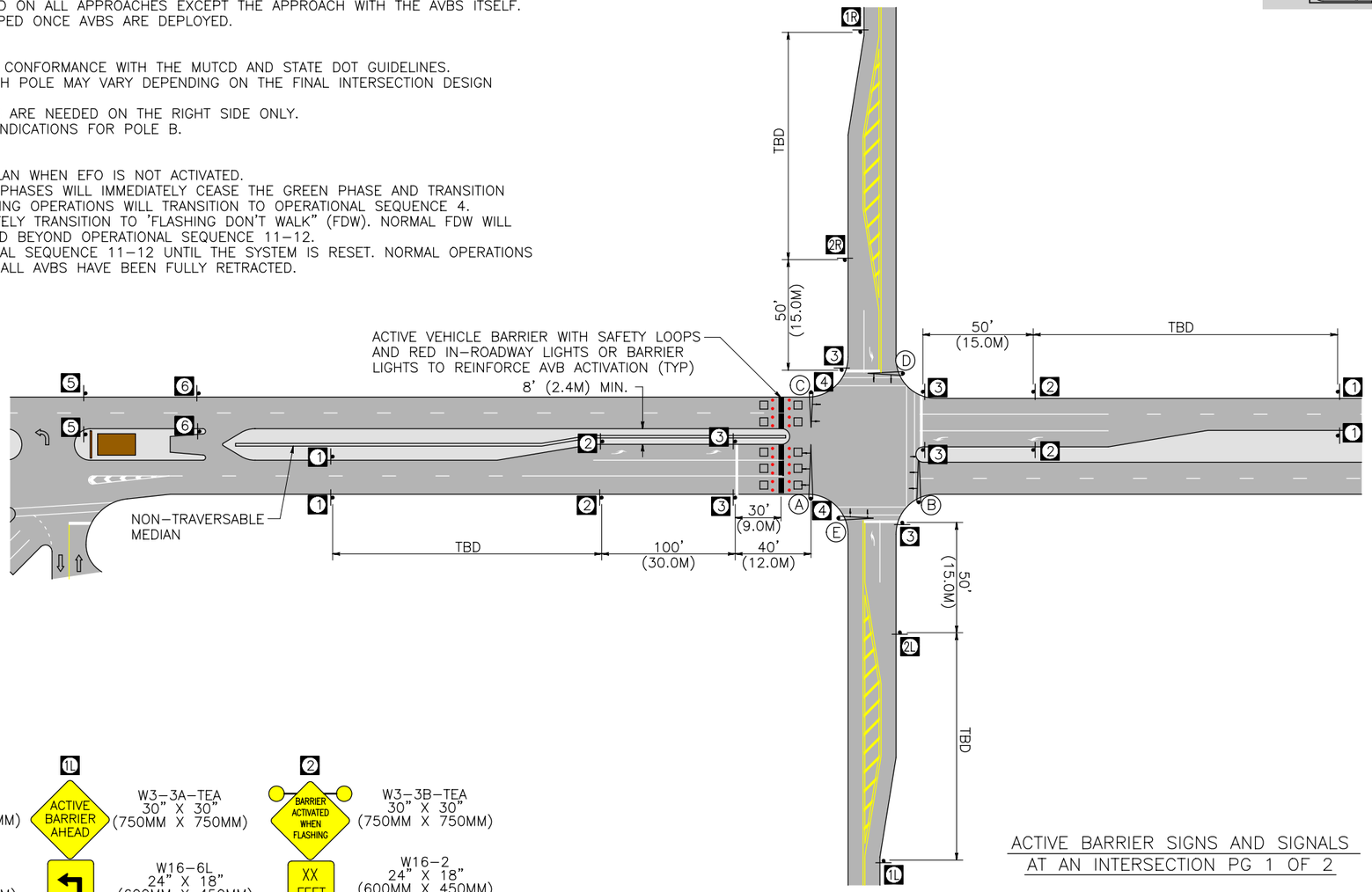
5. ALL SIGNALS AND SIGNS SHALL BE IN CONFORMANCE WITH THE MUTCD AND STATE DOT GUIDELINES.
6. SIGNAL AND SIGN INDICATIONS ON EACH POLE MAY VARY DEPENDING ON THE FINAL INTERSECTION DESIGN AND PHASING OPERATION.
7. FOR SINGLE LANE APPROACHES, SIGNS ARE NEEDED ON THE RIGHT SIDE ONLY.
8. USE OPTICALLY PROGRAMMED SIGNAL INDICATIONS FOR POLE B.

NORMAL MODE TO EFO ACTIVATION

9. SIGNAL TO RUN "NORMAL" PHASING PLAN WHEN EFO IS NOT ACTIVATED.
10. UPON EFO ACTIVATION, ALL "NORMAL" PHASES WILL IMMEDIATELY CEASE THE GREEN PHASE AND TRANSITION TO OPERATIONAL SEQUENCE 4. FLASHING OPERATIONS WILL TRANSITION TO OPERATIONAL SEQUENCE 4.
11. ALL "WALK" INDICATIONS WILL IMMEDIATELY TRANSITION TO 'FLASHING DON'T WALK" (FDW). NORMAL FDW WILL BE PROVIDED AND MAY BE COMPLETED BEYOND OPERATIONAL SEQUENCE 11–12.
12. ALL DEVICES TO REMAIN IN OPERATIONAL SEQUENCE 11–12 UNTIL THE SYSTEM IS RESET. NORMAL OPERATIONS TO RESET TO MAINLINE GREEN ONCE ALL AVBS HAVE BEEN FULLY RETRACTED.



BARRIER ACTIVATION SIGNING DETAIL



ACTIVE BARRIER SIGNS AND SIGNALS AT AN INTERSECTION PG 1 OF 2

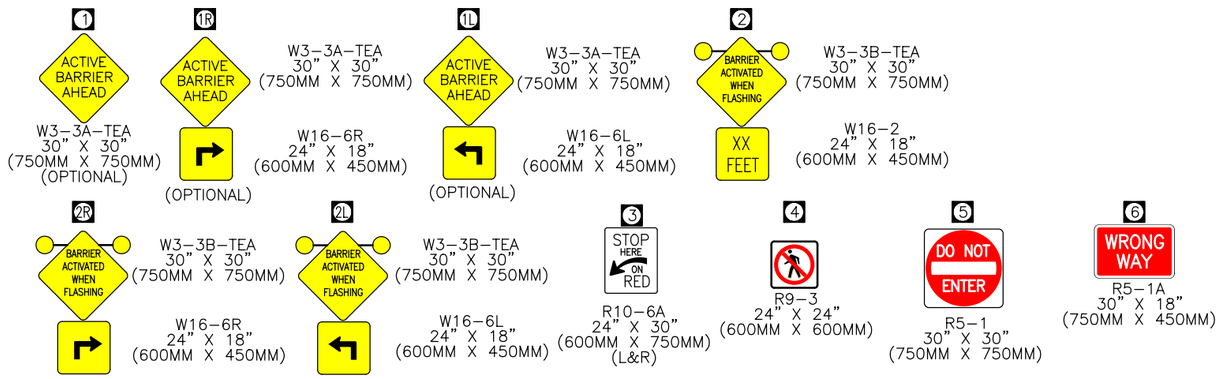
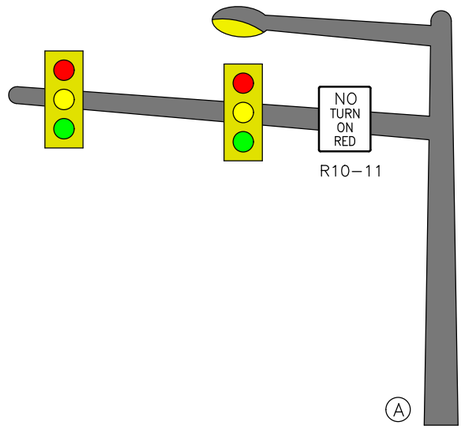
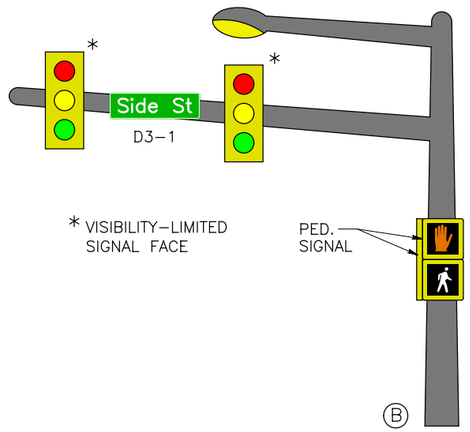
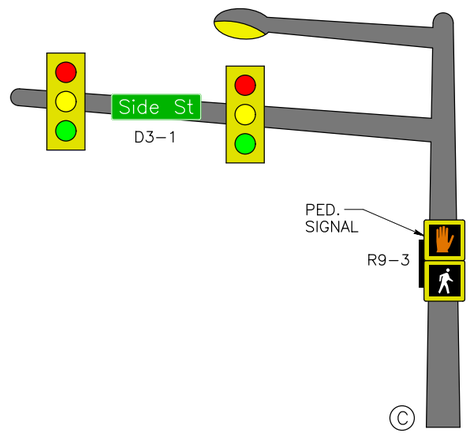


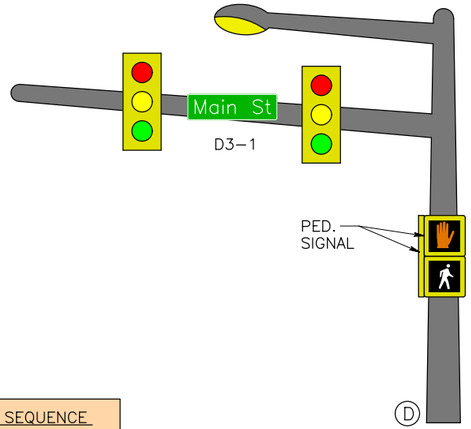
EXHIBIT 3.30

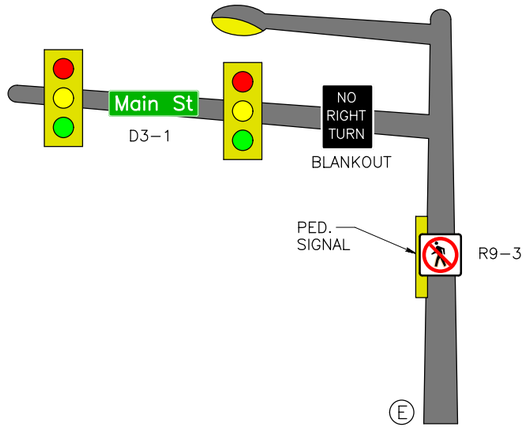
AVB SYSTEM COLLOCATED AT AN INTERSECTION

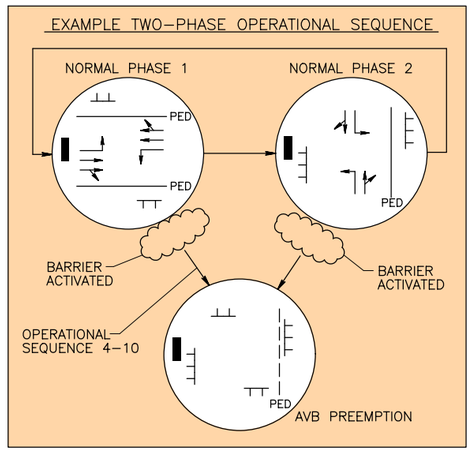












ACTIVE BARRIER SIGNS AND SIGNALS AT AN INTERSECTION PG 2 OF 2

		OPERATIONAL SEQUENCING FOR EMERGENCY FAST OPERATIONS (MIN FOR SAFETY – 25 MPH (40KPH) DESIGN SPEED)											
	TRAFFIC CONTROL	–	1	2	3	4	5	6	7	8	9	10–11	12
		NORMAL OPS	GUARD PERCEPTION AND REACTION TIME TO THREAT (EFO BUTTON)			YELLOW CHANGE (MUTCD MINIMUM)			ALL RED SAFETY	ALL RED SAFETY	ALL RED SAFETY	DEPLOYING BARRIER	THREAT CONTAINED
AVB SYSTEM COLLOCATED AT AN INTERSECTION	WARNING SIGN WITH BEACONS	DARK	DARK	DARK	DARK	ALT FY	ALT FY	ALT FY	ALT FY	ALT FY	ALT FY	ALT FY	ALT FY
	TRAFFIC SIGNAL	G	G	G	G	Y	Y	Y	R	R	R	ALL RED	ALL RED
	IN–ROADWAY LIGHTS ON BARRIER	DARK	DARK	DARK	DARK	DARK	DARK	DARK	FR	FR	FR	FR	FR
	ACTIVE VEHICLE BARRIER	DOWN	DOWN	DOWN	DOWN	DOWN	DOWN	DOWN	DOWN	DOWN	DOWN	ACTIVATED	ACTIVATED/ DEPLOYED
	NO RIGHT TURN BLANKOUT (POLE E)	DARK	DARK	DARK	DARK	DARK	DARK	DARK	NRT	NRT	NRT	NRT	NRT

EXHIBIT 3.31

AVB SYSTEM COLLOCATED AT AN INTERSECTION

1
ACTIVE BARRIER AHEAD
W3-3A-TEA
30" X 30"
(750MM X 750MM)
(OPTIONAL)

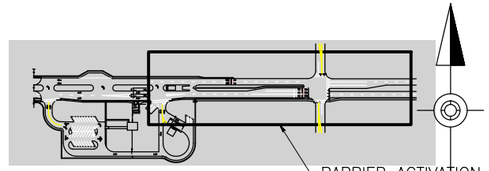
2
BARRIER ACTIVATED WHEN FLASHING
XX FEET
W3-3B-TEA
30" X 30"
(750MM X 750MM)
W16-2
24" X 18"
(600MM X 450MM)

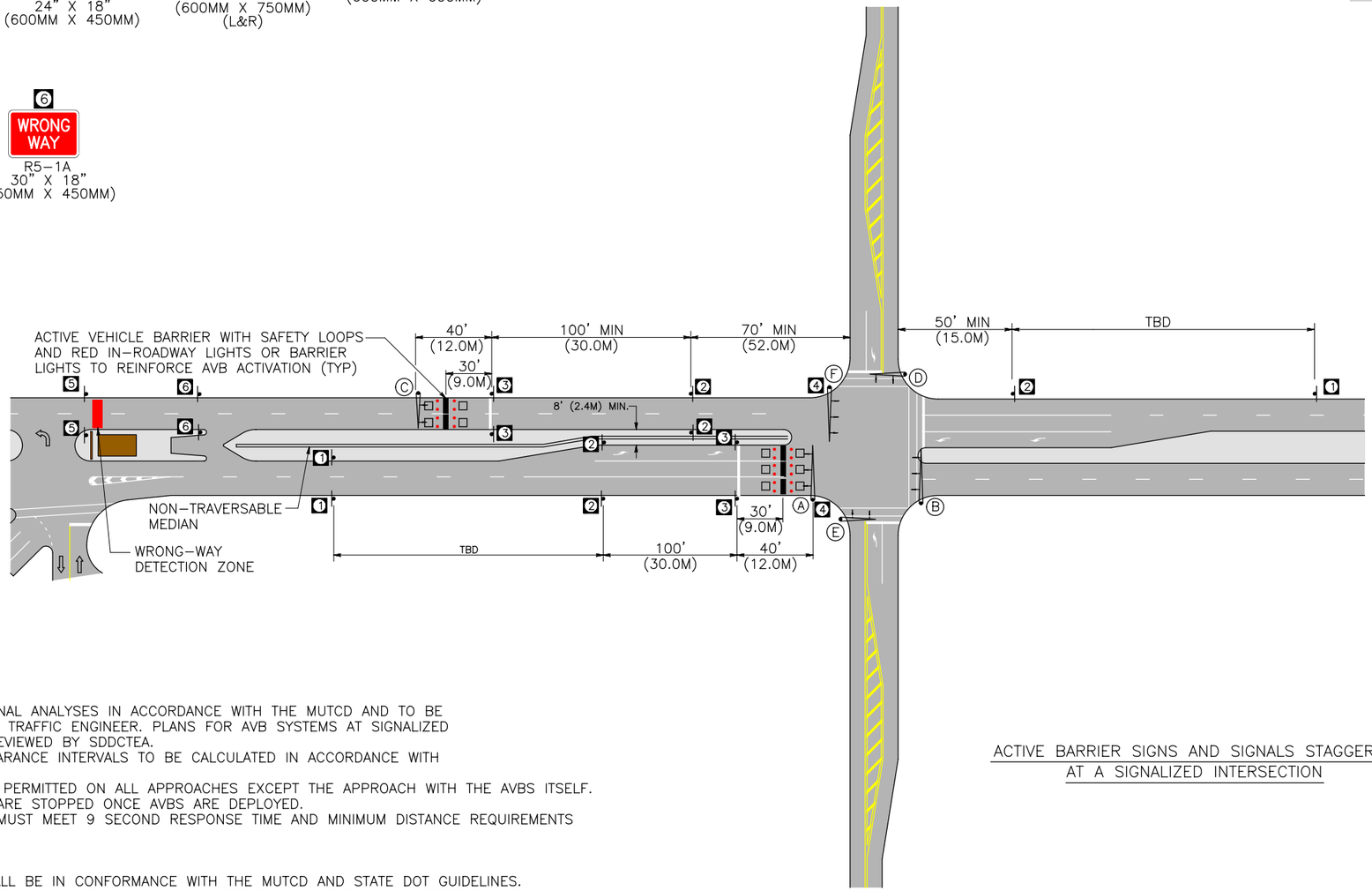
3
STOP HERE ON RED
R10-6A
24" X 30"
(600MM X 750MM)
(L&R)

4
R9-3
24" X 24"
(600MM X 600MM)

5
DO NOT ENTER
R5-1
30" X 30"
(750MM X 750MM)

6
WRONG WAY
R5-1A
30" X 18"
(750MM X 450MM)


BARRIER ACTIVATION SIGNING DETAIL



ACTIVE BARRIER SIGNS AND SIGNALS STAGGERED AT A SIGNALIZED INTERSECTION

NOTES:

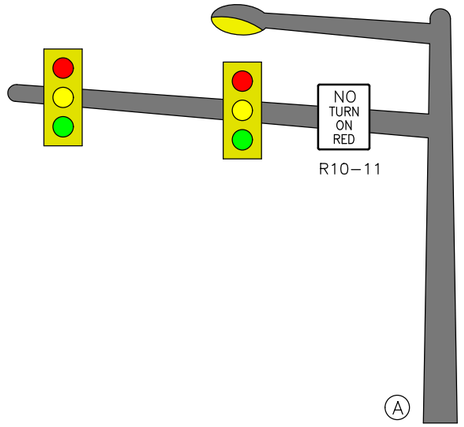
GENERAL:
1. FINAL DESIGN AND OPERATIONAL ANALYSES IN ACCORDANCE WITH THE MUTCD AND TO BE PERFORMED BY A QUALIFIED TRAFFIC ENGINEER. PLANS FOR AVB SYSTEMS AT SIGNALIZED INTERSECTIONS SHALL BE REVIEWED BY SDDCTEA.
2. FINAL YELLOW AND RED CLEARANCE INTERVALS TO BE CALCULATED IN ACCORDANCE WITH THE MUTCD.
3. PEDESTRIAN CROSSINGS ARE PERMITTED ON ALL APPROACHES EXCEPT THE APPROACH WITH THE AVBS ITSELF.
4. ALL VEHICULAR MOVEMENTS ARE STOPPED ONCE AVBS ARE DEPLOYED.
5. OUTBOUND AVB PLACEMENT MUST MEET 9 SECOND RESPONSE TIME AND MINIMUM DISTANCE REQUIREMENTS FROM INTERSECTION.

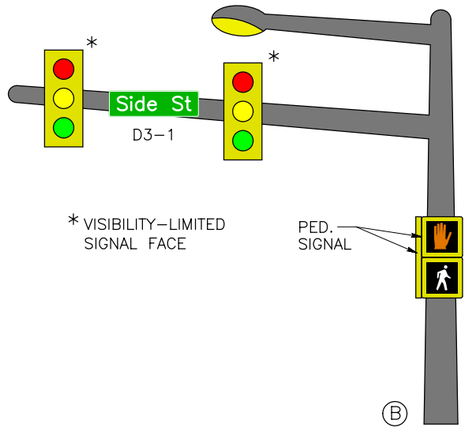
SIGNALS AND SIGNS
6. ALL SIGNALS AND SIGNS SHALL BE IN CONFORMANCE WITH THE MUTCD AND STATE DOT GUIDELINES.
7. SIGNAL AND SIGN INDICATIONS ON EACH POLE MAY VARY DEPENDING ON THE FINAL INTERSECTION DESIGN AND PHASING OPERATION.
8. FOR SINGLE LANE APPROACHES, SIGNS ARE NEEDED ON THE RIGHT SIDE ONLY.
9. USE OPTICALLY PROGRAMMED SIGNAL INDICATIONS FOR POLE B.

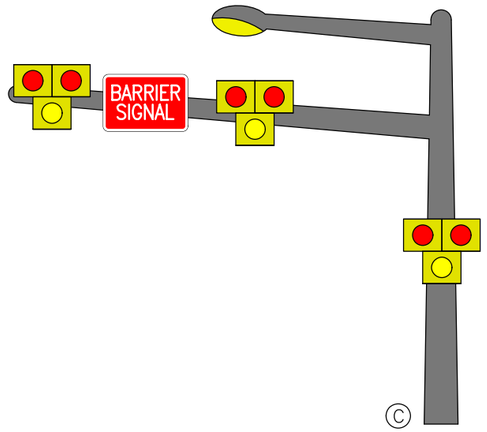
NORMAL MODE TO EFO ACTIVATION
10. SIGNAL TO RUN "NORMAL" PHASING PLAN WHEN EFO IS NOT ACTIVATED.
11. UPON EFO ACTIVATION, ALL "NORMAL" PHASES WILL IMMEDIATELY CEASE THE GREEN PHASE AND TRANSITION TO OPERATIONAL SEQUENCE 4. FLASHING OPERATIONS WILL TRANSITION TO OPERATIONAL SEQUENCE 4.
12. ALL "WALK" INDICATIONS WILL IMMEDIATELY TRANSITION TO "FLASHING DON'T WALK" (FDW). NORMAL FDW WILL BE PROVIDED AND MAY BE COMPLETED BEYOND OPERATIONAL SEQUENCE 10.
13. ALL DEVICES TO REMAIN IN OPERATIONAL SEQUENCE 10 UNTIL THE SYSTEM IS RESET. NORMAL OPERATIONS TO RESET TO MAINLINE GREEN ONCE ALL AVBS HAVE BEEN FULLY RETRACTED.

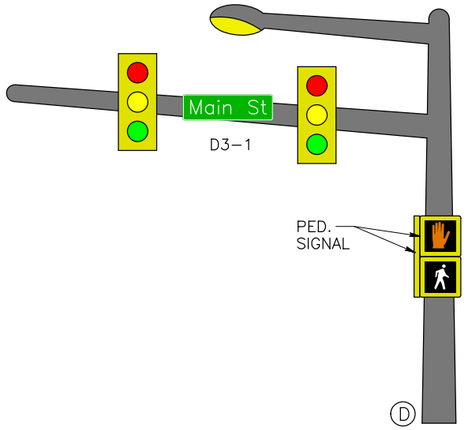
EXHIBIT 3.32

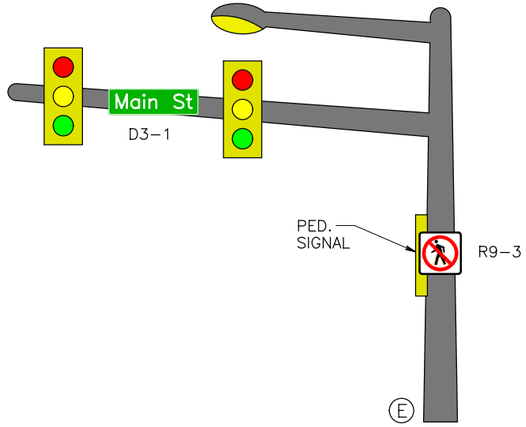
AVB SYSTEM STAGGERED AT AN INTERSECTION

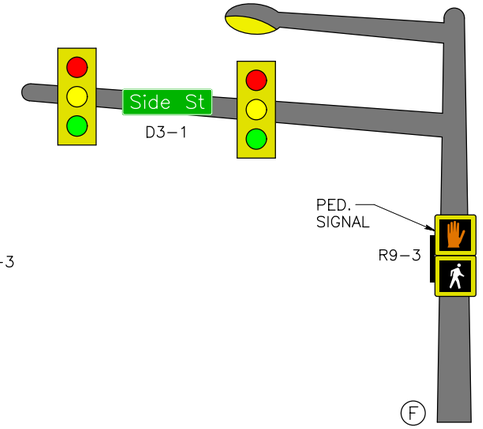


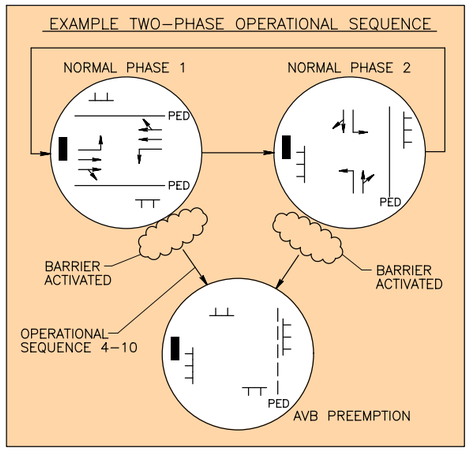












ACTIVE BARRIER SIGNS AND SIGNALS STAGGERED AT AN INTERSECTION PG 2 OF 2

	OPERATIONAL SEQUENCING FOR EMERGENCY FAST OPERATIONS (MIN FOR SAFETY – 25 MPH (40KPH) DESIGN SPEED)											
	TRAFFIC CONTROL	–	1	2	3	4	5	6	7	8	9	10
		NORMAL OPS	GUARD PERCEPTION AND REACTION TIME TO THREAT (EFO BUTTON)			YELLOW CHANGE (MUTCD MINIMUM)			ALL RED	DEPLOYING BARRIER		THREAT CONTAINED
AVB SYSTEM STAGGERED AT AN INTERSECTION	WARNING SIGN WITH BEACONS	DARK	DARK	DARK	DARK	ALT FY	ALT FY	ALT FY	ALT FY	ALT FY	ALT FY	ALT FY
	HYBRID BEACON	DARK	DARK	DARK	DARK	FLASHING YELLOW	STEADY YELLOW	STEADY YELLOW	STEADY YELLOW	ALT FR	ALT FR	ALT FR
	TRAFFIC SIGNAL	G	G	G	G	Y	Y	Y	STEADY RED	STEADY RED	ALL RED	ALL RED
	IN–ROADWAY LIGHTS ON BARRIER	DARK	DARK	DARK	DARK	DARK	DARK	DARK	FR	FR	FR	FR
	ACTIVE VEHICLE BARRIER	DOWN	DOWN	DOWN	DOWN	DOWN	DOWN	DOWN	DOWN	ACTIVATED	ACTIVATED	DEPLOYED

EXHIBIT 3.33

AVB SYSTEM
STAGGERED AT
AN INTERSECTION

3.6.4.3 Response Zone Alternative Treatments

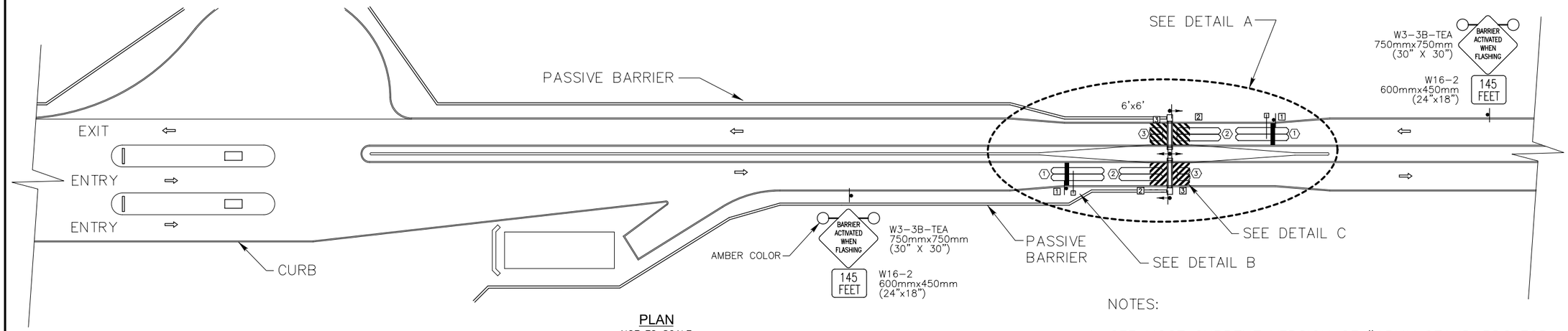
In many cases, it is not practical or feasible to provide the distance needed for a conventional, straight response zone to accommodate the threat scenario and response and safety time. The only way to minimize the total distance is to:

- Limit the threat speed - The length of the response zone can be minimized, or the available response time increased by using passive barriers and roadway layout to physically limit the velocity of threat vehicles as they travel through the ACP zones.
- Reduce time - Change the operational features through technology so that the time requirements can be reduced. Particularly, the High Efficiency Presence Detection safety scheme reduced the amount of required time; however this is a more complex system.

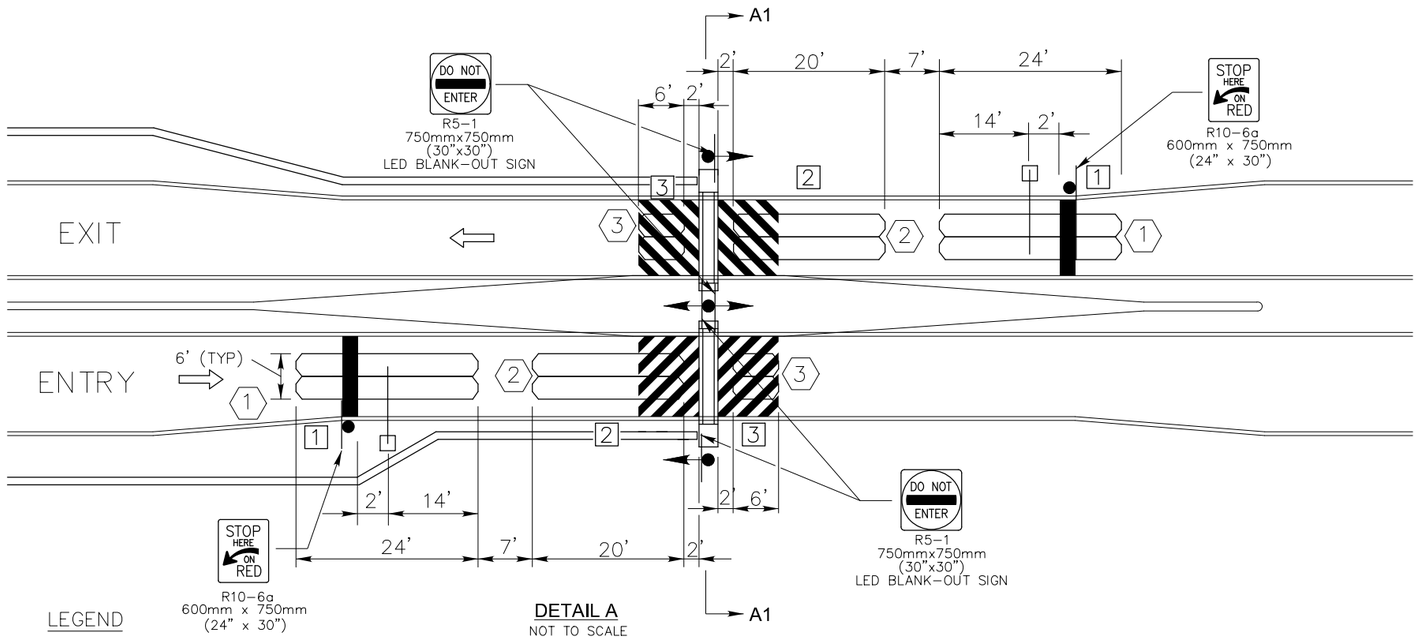
SDDCTEA has developed other barrier safety schemes that use these alternative treatment practices, when the conventional safety scheme cannot be used. These include the following:

High Efficiency Presence Detection Safety Scheme (exhibit 3.34, exhibit 3.35, exhibit 3.36, and exhibit 3.37): With this system, a minimum of 7 seconds must be provided. If there are no vehicles detected, the traffic arm is down and the traffic signal is red. When a vehicle approaches, it is detected, the traffic arm raises and the signal turns green allowing the vehicle to continue. If more vehicles are following, the signal remains green, the traffic arm stays up and vehicles continue. Once the last vehicle exits and a new vehicle is not detected after a few seconds, the traffic signal turns yellow then red and the traffic arm lowers. For more information, refer to SDDCTEA Pamphlet 55-15.

Stop Control Safety System (exhibit 3.38): This system was initiated by the need to retrofit AVB safety at constrained locations with relatively low traffic volume; less than 600 vehicles per hour per lane. This system requires all vehicles inbound and outbound to stop at the AVB. This requirement effectively eliminates the need to transition from a green signal to a yellow signal and finally to a red. A minimum of 5 seconds is required for this safety scheme. For more information refer to SDDCTEA Pamphlet 55-15.



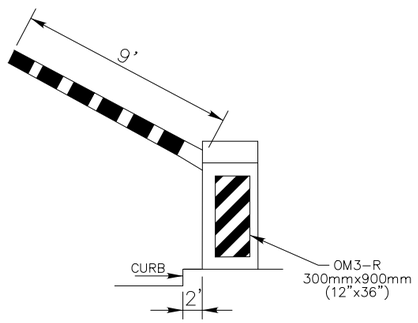
PLAN
NOT TO SCALE



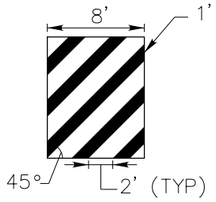
DETAIL A
NOT TO SCALE

LEGEND

- ACTIVE VEHICLE BARRIER TO DEPLOY UP FROM LANE.
- QUADRUPOLE INDUCTIVE LOOP DETECTOR
- LOOP DETECTION AREA NUMBER
- POST MOUNTED SIGN ON SHOULDER, LANE ISLAND, OR IN MEDIAN
- TRAFFIC GATE ARM
- TRAFFIC SIGNAL
- STOP LINE
- GUARDRAIL
- WHITE CROSSHATCHING PAVEMENT MARKINGS
- 2 BREAK BEAM SENSOR



DETAIL B



DETAIL C

NOTES:

1. SEE MOST CURRENT VERSION OF "ARMY STANDARDS FOR ACPs" FOR DETAILS OF THE PASSIVE AND ACTIVE VEHICLE BARRIER INTERFACES, SIGN DETAILS AND TYPICAL LAYOUTS AND PAVEMENT MARKING DETAILS.
2. WHEN EFO IS ACTIVATED, A 100db AUDIBLE ALARM AT THE AVB SHALL SOUND UNTIL AVB IS SECURED.
3. SIGNS AND SIGNALS SHALL CONFORM TO MUTCD, SDDCTEA PAMPHLET 55-15 AND LOCAL REGULATIONS.
4. ALTERNATING RED AND WHITE TYPE X RETROREFLECTIVE SHEETING REQUIRED ON TRAFFIC ARMS AND ACTIVE VEHICLE BARRIERS AS PER SDDCTEA PAMPLET 55-15.
5. OBJECT MARKERS INSTALLED ON TRAFFIC ARM BASE AND NORMALLY EXPOSED ACTIVE VEHICLE BARRIER EQUIPMENT ARE REQUIRED.
6. ALL PAVEMENT MARKINGS SHALL BE RETROREFLECTIVE AND DESIGNED TO ENHANCE TRACTION. TRANSVERSE MARKINGS SHALL BE WHITE.
7. LOOP 1 – GATE ARM LOOP, LOOP 2 – ENTRY SAFETY LOOP, LOOP 3 – EXIT SAFETY LOOP.
8. SECTION A1-A1 SHOWN ON THE FOLLOWING PAGE.
9. INFRARED CAMERAS MAY BE USED IN LIEU OF LOOP DETECTORS.
10. BREAK BEAM SENSORS TO PROVIDE REDUNDANCY FOR THE SAFETY OF BICYCLES AND MOTORCYCLES.
11. TRAFFIC ARMS SHALL BE BREAKAWAY.
12. MOUNT R10-6a SIGN SUCH THAT THE MOUNTING HEIGHT, MEASURED FROM THE BOTTOM OF THE SIGN TO THE GROUND, IS 2 FEET.
13. CENTER MEDIAN LENGTH SHALL EXTEND AT LEAST 25 FEET PRIOR TO THE STOP LINE ON EACH APPROACH.
14. LED BLANK-OUT SIGN SHALL NOT AUTOMATICALLY DIM.

EXHIBIT 3.34

MILITARY SURFACE DEPLOYMENT AND DISTRIBUTION COMMAND TRANSPORTATION ENGINEERING AGENCY

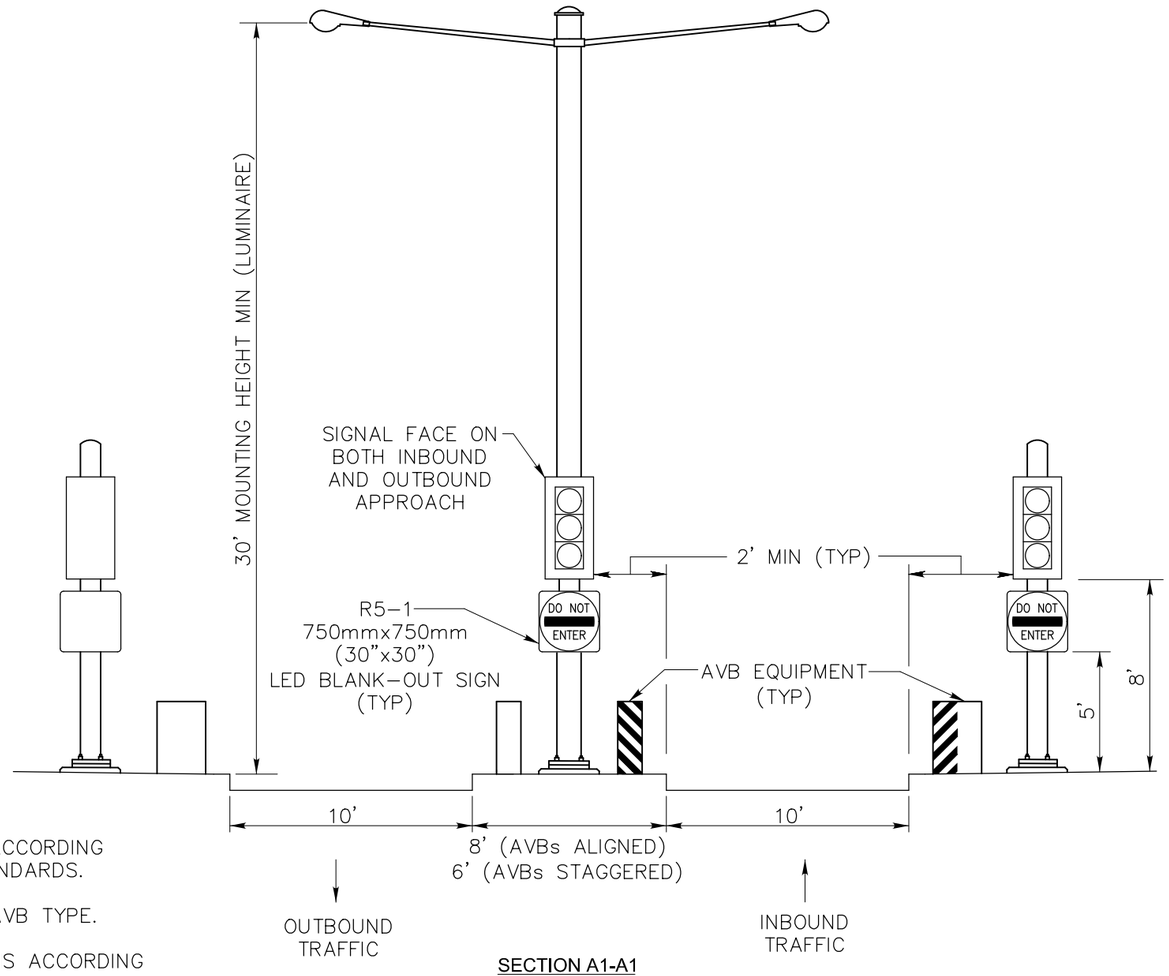
SYMBOL	DESCRIPTION	DATE	BY

DESIGNED BY: MED
DWN BY: ADM
CKD BY: REB
SUBMITTED BY:
FILE NAME:
DATE: 20 MARCH 2015
SOLICITATION NO.:
CONTRACT NO.:
CATEGORY CODE:
PLOT DATE:
PLOT SCALE:
SIZE:

ONE-LANE HIGH EFFICIENCY PRESENCE DETECTION (PLAN VIEW)

SHEET NUMBER
1 OF 4

	OPERATIONAL SEQUENCING FOR EMERGENCY FAST OPERATIONS							
	TRAFFIC CONTROL	GUARD REACTION			SAFETY INTERVAL		DEPLOYING BARRIER	THREAT CONTAINED
	TIMELINE (SEC)	1	2	3	4	5	6	7	--
ONE– LANE HIGH EFFICIENCY PRESENCE DETECTION	W3–3B WARNING SIGN WITH BEACONS	DARK			ALTERNATING FLASHING YELLOW			
	DO NOT ENTER LED BLANK–OUT SIGN	DARK			"DO NOT ENTER" ILLUMINATED			
	TRAFFIC SIGNALS	NORMAL OPERATIONS			YELLOW		RED	
	TRAFFIC ARM	NORMAL OPERATIONS			BEGIN DOWN		DOWN	DOWN
	100 dB HORN	SILENT			ACTIVATED			
	ACTIVE VEHICLE BARRIER	DOWN					DEPLOYED	DEPLOYED



SECTION A1-A1
NOT TO SCALE

NOTES:

1. DESIGN ALL POLE FOUNDATIONS ACCORDING TO LOCAL REGULATIONS AND STANDARDS.
2. AVB SUPPORT WIDTHS VARY BY AVB TYPE.
3. DESIGN ALL LED BLANK–OUT SIGNS ACCORDING TO THE MUTCD.
4. ALL SIGNALS SHALL BE LED AND HAVE TUNNEL VISORS WITH LOUVERS AND BACKPLATES. 8–INCH INDICATIONS SHALL BE USED.
5. MEDIAN AND LANE WIDTHS SHOWN ARE RECOMMENDED. CHANGES MAY BE MADE WITH APPROVAL FROM SDDCTEA.
6. HEIGHT TO BOTTOM OF THE DO NOT ENTER SIGN AND THE HEIGHT TO BOTTOM OF THE SIGNAL IS REQUIRED.

EXHIBIT 3.35

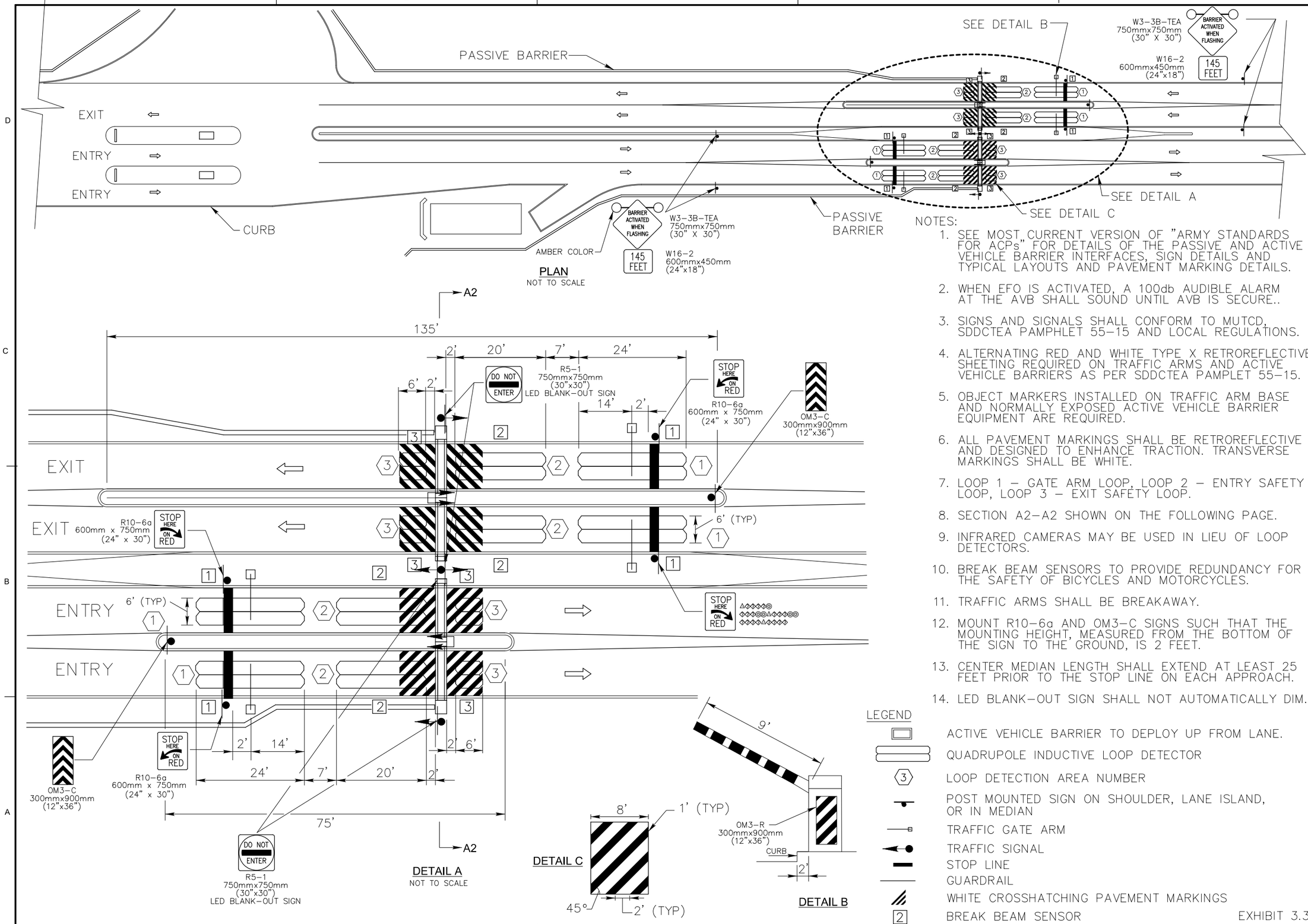
MILITARY SURFACE DEPLOYMENT AND DISTRIBUTION COMMAND TRANSPORTATION ENGINEERING AGENCY

SYMBOL	DESCRIPTION	DATE	BY

DESIGNED BY: MED
DWN BY:
ADM:
CKD BY: REB
SUBMITTED BY:
FILE NAME:
DATE: 20 MARCH 2015
SOLICITATION NO.:
CONTRACT NO.:
CATEGORY CODE:
SIZE:
PLOT SCALE:
PLOT DATE:

ONE-LANE HIGH EFFICIENCY PRESENCE DETECTION SECTION A1-A1

SHEET NUMBER
2 OF 4



NOTES:

1. SEE MOST CURRENT VERSION OF "ARMY STANDARDS FOR ACPs" FOR DETAILS OF THE PASSIVE AND ACTIVE VEHICLE BARRIER INTERFACES, SIGN DETAILS AND TYPICAL LAYOUTS AND PAVEMENT MARKING DETAILS.
2. WHEN EFO IS ACTIVATED, A 100db AUDIBLE ALARM AT THE AVB SHALL SOUND UNTIL AVB IS SECURE..
3. SIGNS AND SIGNALS SHALL CONFORM TO MUTCD, SDDCTEA PAMPHLET 55-15 AND LOCAL REGULATIONS.
4. ALTERNATING RED AND WHITE TYPE X RETROREFLECTIVE SHEETING REQUIRED ON TRAFFIC ARMS AND ACTIVE VEHICLE BARRIERS AS PER SDDCTEA PAMPLET 55-15.
5. OBJECT MARKERS INSTALLED ON TRAFFIC ARM BASE AND NORMALLY EXPOSED ACTIVE VEHICLE BARRIER EQUIPMENT ARE REQUIRED.
6. ALL PAVEMENT MARKINGS SHALL BE RETROREFLECTIVE AND DESIGNED TO ENHANCE TRACTION. TRANSVERSE MARKINGS SHALL BE WHITE.
7. LOOP 1 – GATE ARM LOOP, LOOP 2 – ENTRY SAFETY LOOP, LOOP 3 – EXIT SAFETY LOOP.
8. SECTION A2-A2 SHOWN ON THE FOLLOWING PAGE.
9. INFRARED CAMERAS MAY BE USED IN LIEU OF LOOP DETECTORS.
10. BREAK BEAM SENSORS TO PROVIDE REDUNDANCY FOR THE SAFETY OF BICYCLES AND MOTORCYCLES.
11. TRAFFIC ARMS SHALL BE BREAKAWAY.
12. MOUNT R10-6a AND OM3-C SIGNS SUCH THAT THE MOUNTING HEIGHT, MEASURED FROM THE BOTTOM OF THE SIGN TO THE GROUND, IS 2 FEET.
13. CENTER MEDIAN LENGTH SHALL EXTEND AT LEAST 25 FEET PRIOR TO THE STOP LINE ON EACH APPROACH.
14. LED BLANK-OUT SIGN SHALL NOT AUTOMATICALLY DIM.

LEGEND

- ACTIVE VEHICLE BARRIER TO DEPLOY UP FROM LANE.
- QUADRUPOLE INDUCTIVE LOOP DETECTOR
- (3) LOOP DETECTION AREA NUMBER
- POST MOUNTED SIGN ON SHOULDER, LANE ISLAND, OR IN MEDIAN
- TRAFFIC GATE ARM
- TRAFFIC SIGNAL
- STOP LINE
- GUARDRAIL
- WHITE CROSSHATCHING PAVEMENT MARKINGS
- [2] BREAK BEAM SENSOR

EXHIBIT 3.36

MILITARY SURFACE DEPLOYMENT AND DISTRIBUTION COMMAND TRANSPORTATION ENGINEERING AGENCY

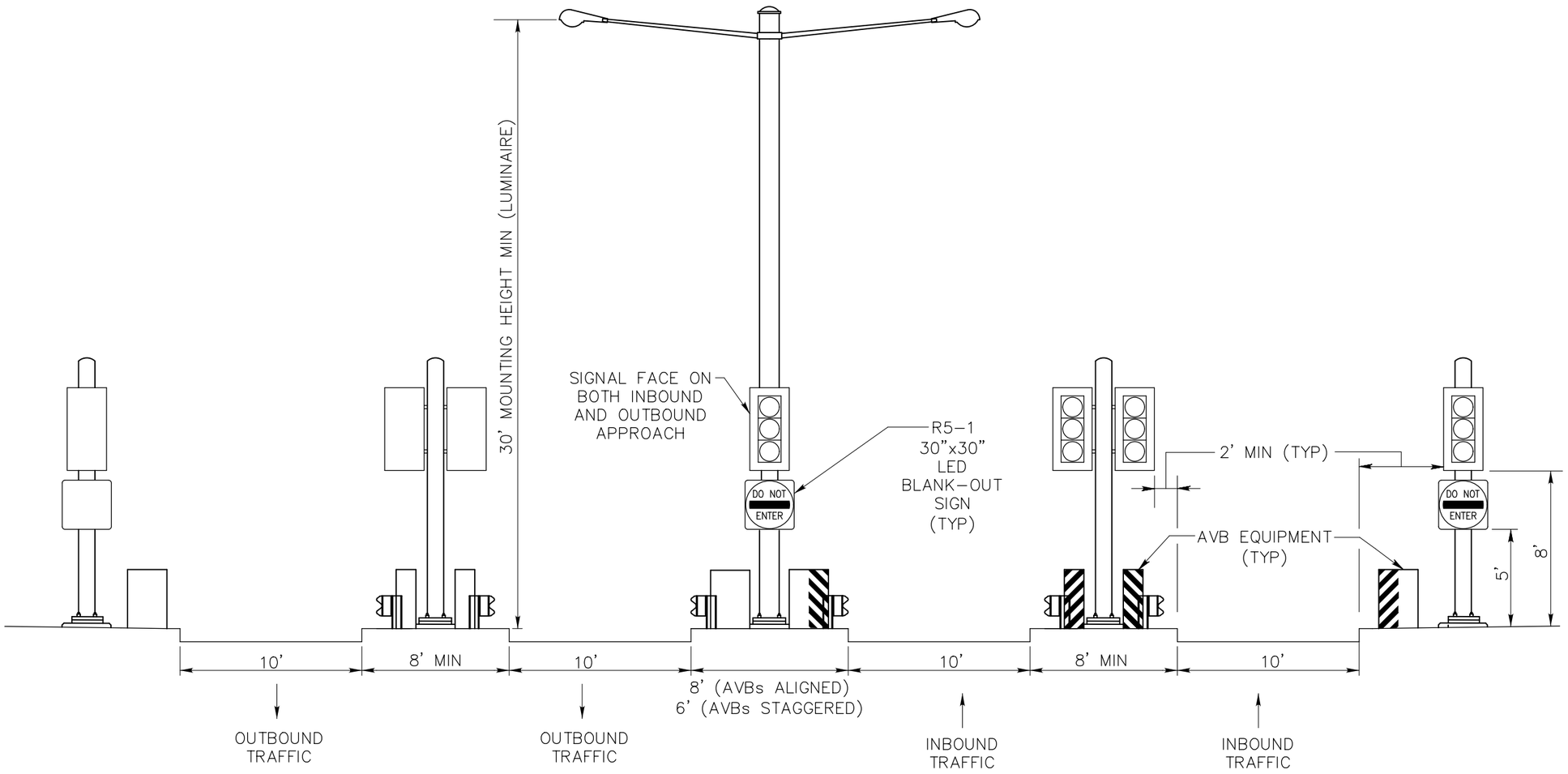
BY	DATE	DESCRIPTION	SYMBOL

DATE: 20 MARCH 2015
SOLICITATION NO.:
CONTRACT NO.:
CATEGORY CODE:
PLOT DATE:
DESIGNED BY: MED
DWN BY: ADM
CKD BY: REB
SUBMITTED BY:
FILE NAME:
PLOT SCALE:
SIZE:

TWO-LANE HIGH EFFICIENCY PRESENCE DETECTION (PLAN VIEW)

SHEET NUMBER 3 OF 4

	OPERATIONAL SEQUENCING FOR EMERGENCY FAST OPERATIONS							
TWO– LANE HIGH EFFICIENCY PRESENCE DETECTION	TRAFFIC CONTROL	GUARD REACTION			SAFETY INTERVAL		DEPLOYING BARRIER	THREAT CONTAINED
	TIMELINE (SEC)	1	2	3	4	5	6	7	--
	W3–3B WARNING SIGN WITH BEACONS	DARK			ALTERNATING FLASHING YELLOW			
	DO NOT ENTER LED BLANK–OUT SIGN	DARK			"DO NOT ENTER" ILLUMINATED			
	TRAFFIC SIGNALS	NORMAL OPERATIONS			YELLOW		RED	
	TRAFFIC ARM	NORMAL OPERATIONS			BEGIN DOWN		DOWN	DOWN
	100 dB HORN	SILENT			ACTIVATED			
	ACTIVE VEHICLE BARRIER	DOWN					DEPLOYED	DEPLOYED



SECTION A2-A2
NOT TO SCALE

NOTES:

1. DESIGN ALL POLE FOUNDATIONS ACCORDING TO LOCAL REGULATIONS AND STANDARDS.
2. AVB SUPPORT WIDTHS VARY BY AVB TYPE.
3. DESIGN ALL LED BLANK–OUT SIGNS ACCORDING TO THE MUTCD.
4. ALL SIGNALS SHALL BE LED AND HAVE BACKPLATES. LOUVERS ARE OPTIONAL BASED ON SITE CONDITIONS. 8–INCH INDICATIONS SHALL BE USED.
5. MEDIAN AND LANE WIDTHS SHOWN ARE RECOMMENDED. CHANGES MAY BE MADE WITH APPROVAL FROM SDDCTEA.

EXHIBIT 3.37

MILITARY SURFACE DEPLOYMENT AND DISTRIBUTION COMMAND TRANSPORTATION ENGINEERING AGENCY

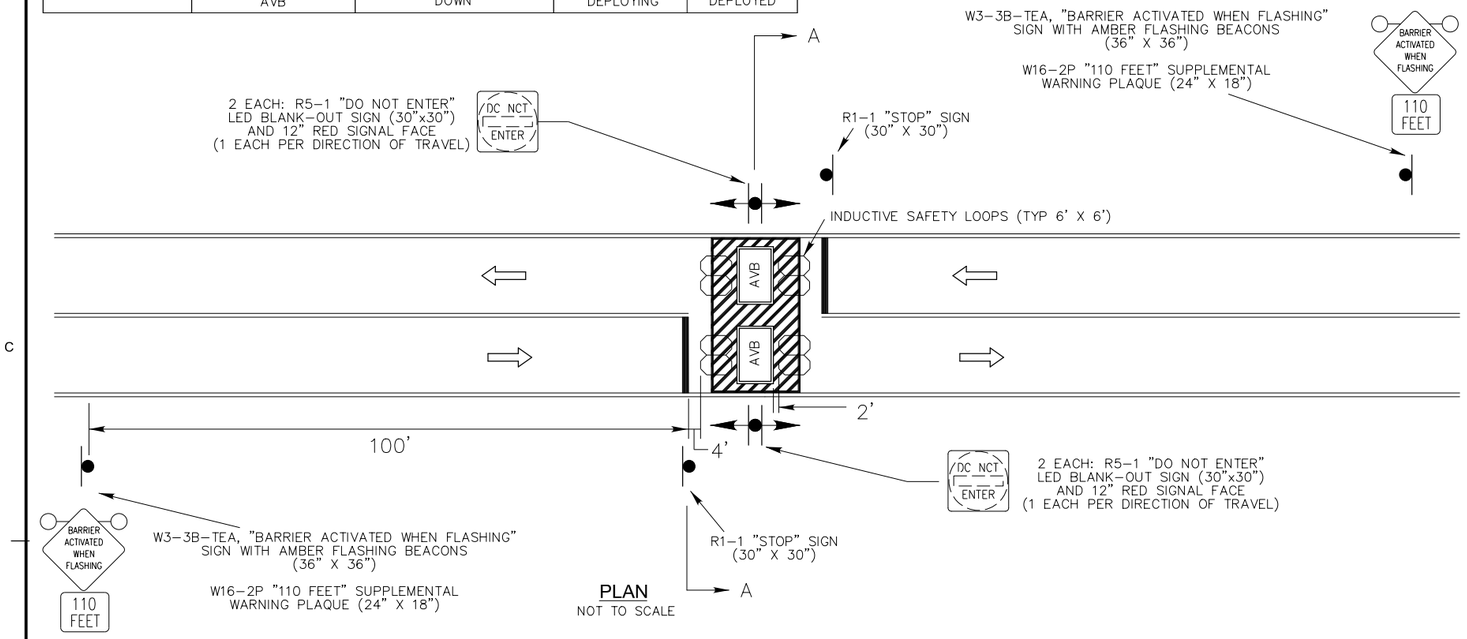
SYMBOL	DESCRIPTION	DATE	BY

DESIGNED BY: MED
DWN BY: ADM
CKD BY: REB
SUBMITTED BY:
FILE NAME:
DATE: 20 MARCH 2015
SOLICITATION NO.:
CONTRACT NO.:
CATEGORY CODE:
PLOT SCALE:
SIZE:
PLOT DATE:

TWO-LANE HIGH EFFICIENCY PRESENCE DETECTION SECTION A2-A2

SHEET NUMBER
4 OF 4

STOP CONTROL AVB SAFETY SCHEME	OPERATIONAL SEQUENCING FOR EMERGENCY FAST OPERATIONS					
	TRAFFIC CONTROL	GUARD REACTION			BARRIER DEPLOYMENT	THREAT CONTAINED
	TIMELINE (sec)	1	2	3	4	5	– –
	W3-3b-TEA WARNING SIGN WITH BEACONS	BEACONS DARK			ALTERNATING FLASHING YELLOW	
	DO NOT ENTER LED BLANK-OUT SIGN	DARK			"DO NOT ENTER" ILLUMINATED	
	RED SIGNAL	DARK			STEADY RED	
	100 dB HORN	SILENT			ACTIVATED	
	AVB	DOWN			DEPLOYING	DEPLOYED



PLAN
NOT TO SCALE

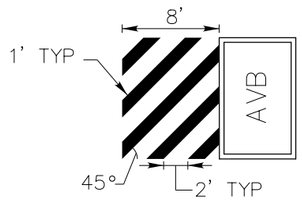
NOTES:

1. THIS SCHEME IS NOT INTENDED FOR USE WHERE TRAFFIC VOLUME EXCEEDS 800 VEHICLES PER HOUR PER LANE.
2. WHEN EFO IS ACTIVATED, A 100dB ALARM LOCATED AT THE AVB SHALL SOUND FOR AT LEAST 10 SECONDS, AND BE DIRECTED TOWARDS ONCOMING TRAFFIC; BOTH DIRECTIONS.
3. SIGNS AND SIGNALS SHALL CONFORM TO THE MUTCD, AND SDDCTEA PAMPHLETS 55-15 AND 55-14.
4. ALTERNATING RED AND WHITE STRIPING REQUIRED ON AVBs AS PER SDDCTEA PAMPHLET 55-15.
5. MUTCD COMPLIANT OBJECT MARKERS ARE REQUIRED ON ALL EXPOSED AVB EQUIPMENT WITHIN THE CLEARZONE.
6. ALL PAVEMENT MARKINGS SHALL BE RETROREFLECTIVE. NO PASSING AND NO PARKING ZONES SHALL APPLY 300' EITHER SIDE OF THE AVB.
7. SIGNAL AND SIGN POSTS SHALL HAVE FRANGIBLE BASES WITH FOUNDATIONS DESIGNED TO LOCAL REGULATIONS AND STANDARDS.
8. ALL SIGNALS SHALL BE LED AND HOODED WITH BACKPLATES. 12-INCH INDICATIONS SHALL BE USED.
9. UNDER EFO CONDITION, AVBs SHALL BE DESIGNED TO OPERATE INDEPENDENTLY IN CONJUNCTION WITH SAFETY LOOP DETECTION.
10. PLAN DETAILS ARE TYPICAL AND MAY BE ADJUSTED TO MEET SITE CONDITIONS UNDER COORDINATION WITH SDDCTEA.

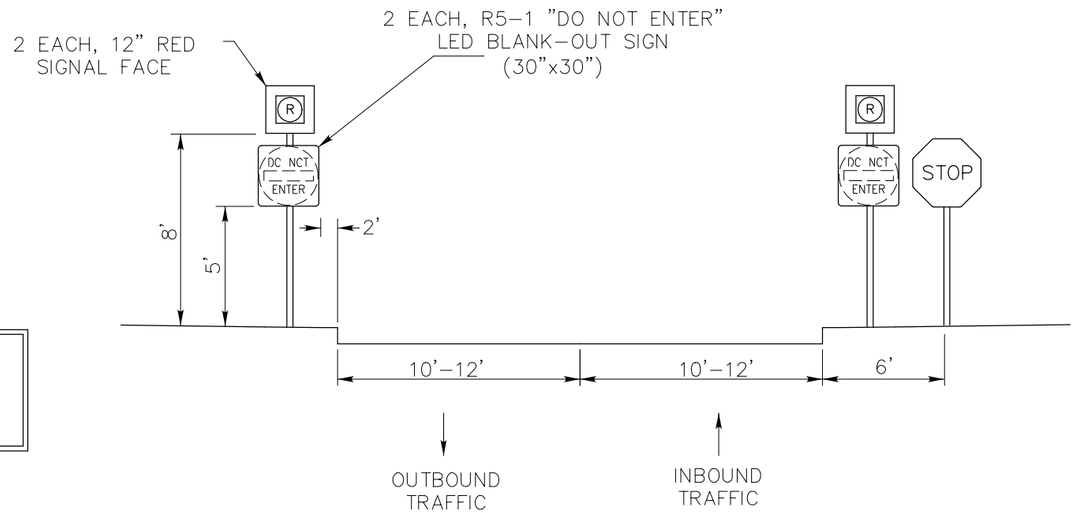
LEGEND

- ACTIVE VEHICLE BARRIER (AVB)
- QUADRUPOLE INDUCTIVE LOOP DETECTOR
- POST MOUNTED SIGN
- AVB SIGNAL
- AVB SIGNAL AND SIGNS ASSEMBLY
- STOP LINE
- TRAFFIC FLOW
- AVB ENVELOPE PAVEMENT MARKING – WHITE

FINAL
MARCH 2015



AVB ENVELOPE PAVEMENT MARKING DETAIL



SECTION A-A
NOT TO SCALE

EXHIBIT 3.38

MILITARY SURFACE DEPLOYMENT AND DISTRIBUTION COMMAND TRANSPORTATION ENGINEERING AGENCY

SYMBOL	DESCRIPTION	DATE	BY

DATE: 20 MARCH 2015
SOLICITATION NO.:
CONTRACT NO.:
CATEGORY CODE:
PLOT DATE:
DESIGNED BY: TJM
DWN BY: TJM
CKD BY: SMR, DGK,DJG,MDC
SUBMITTED BY:
FILE NAME:
PLOT SCALE:
SIZE:

STOP CONTROL
AVB SAFETY SCHEME

SHEET NUMBER
1 OF 1

3.6.4.4 Barrier Up/Barrier Platooning Safety System

In practice, the AVBs are normally closed until the vehicle is authorized for entry. A sally-port operation is utilized with the AVBs to process/reject vehicles. Traffic flow is considerably slower, but this safety system can be acceptable in low volume applications (<200 vehicles per hour per lane). No time is needed for these systems since the barriers are up normally. Since this safety scheme is infrequently utilized in concept drawings, it is not shown in the report; please refer to SDDCTEA Pamphlet 55-15.

3.6.5. Basic Design Elements

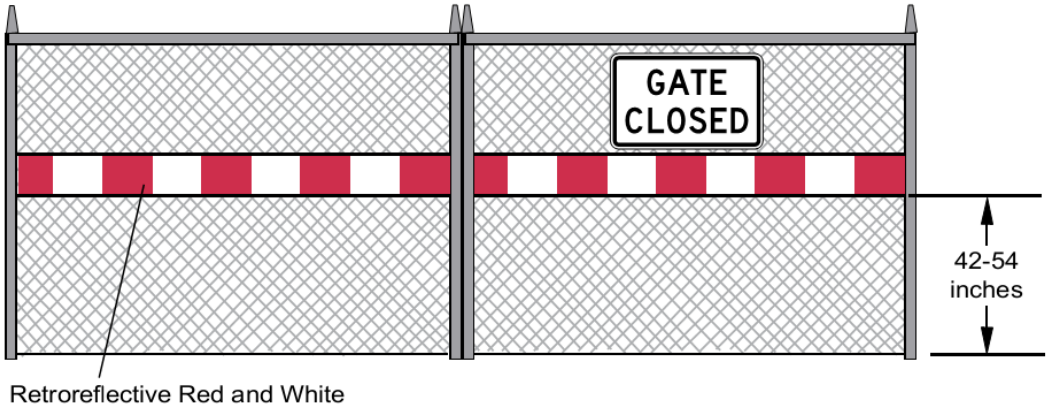
The following sections discuss common ACP design elements that are missing, not compliant or do not meet relevant criteria or guidance. In some instances, the design criteria or guidance states an element "should" be included, as opposed to "shall" be included. This report recommends adhering to all criteria and guidance because of the potential benefits, but notes where adherence is only a recommendation and not a requirement.

3.6.5.1. GATE CLOSED Signing

None of the study ACPs have the correct GATE CLOSED signing. When the improper signing is used, drivers may have difficulty seeing the signs and fencing blocking the road.

As shown in exhibit 3.39 (and in accordance with SDDCTEA Pamphlet 55-15 and the DOD Supplement to the MUTCD), a horizontal panel with retroreflective, alternating, vertical red/white stripes (16 inches in width) should be used during the times when the ACP is closed to traffic. The sign panel must be a minimum of 4 inches in width and span the entire length of the gate on both sides. The total surface area of the retroreflective strip shall not be less than 1152 square inches per approach lane. A minimum of two GATE CLOSED signs (48"x30") should be mounted above the panel for the outbound and inbound lanes, and a sign listing the hours of operation should be installed prior to the gate.

Exhibit 3.39 Proper GATE CLOSED Signing



3.6.5.2. Installation and ACP Speed Limits

An installation speed limit posting should be provided within the installation and can be installed after the ACP ID check area. When lower operating speeds are desired, advisory speeds should be used with warning signing for the situations needing lower speeds.

If the installation is concerned with speeds through the ACP ID check area, an advisory speed of 10 or 15 mph can be installed below the CHECKPOINT sign. Despite it being an advisory speed (vs. a regulatory speed limit), vehicles can still be ticketed for reckless driving.

3.6.5.3. ID Check Islands

ID check islands are used to provide guards an area to work freely and safely. The following list provides requirements and suggested design criteria for ID check islands. The study ACP islands should adhere to all of the design criteria.

From UFC 4-022-01 Page 59:

- Islands must be a minimum length of 50 feet but 75 feet is necessary for tandem checking of vehicles, if required.
- Islands must be capable of accommodating tandem processing.
- Where facilities are located on an island, design the island to provide a minimum of three feet clear on each side of the facility.

From SDDCTEA Pamphlet 55-15 Page 6-6:

- ID check areas should have a depressed step down so that guards can process motorists at eye-level without having to bend over or step into traffic.

3.6.5.4. Passive Barrier

Passive vehicle barriers should encompass a contiguous perimeter around the ACP, with the final denial barriers completing the containment. Breaks in the passive barrier system for pedestrian access to the ACP must not exceed 3.3 feet (1 m) in width for traffic having a 90-degree approach and 4.1 ft (1.25 m) in width for traffic paralleling the barrier per UFC 4-022-01. Note: When procuring and installing passive barrier, refer to UFC 4-022-02 *Selection and Application of Vehicle Barriers* for requirements. Only those barriers on the DoD Approved List of Passive Barrier may be used.

3.6.5.5. Active Vehicle Barriers (AVBs)

AVBs or final denial barriers must be provided at each ACP to prevent a threat vehicle from breeching security per UFC 4-022-01. AVBs shall be provided on the inbound and outbound lanes in order to prevent threat vehicles from using the outgoing lanes to gain access to the installation. AVBs must be located and traffic control must be provided as described in this report, UFC 4-022-01, and SDDCTEA Pamphlet 55-15. UFC 4-022-02 *Selection and Application of Vehicle Barriers* provides the requirements for active vehicle barriers. Only those barriers on the DoD Approved List of Active Vehicle Barrier may be used.

3.6.5.6. Search Areas

Vehicles are inspected in accordance with local directives, from random inspections to inspections of all vehicles entering the installation. Vehicle inspection capabilities should be provided to conduct vehicle searches without impeding the flow of traffic through the ACP per Page 47 of UFC 4-022-01.

Inspection areas ideally should be segregated from the inbound processing lanes and be located prior to or at the ID check area per Page 47 UFC 4-022-01. Inspection areas can be a separate lane or pull-off area. SDDCTEA Pamphlet 55-15 provides a number of examples of POV inspection areas, refer to pages 6-10 and 6-11.

3.6.5.7. Canopy

Page 63 of UFC 4-022-01 states that the main identification area of ACPs should be covered with an overhead canopy. Even though this is a “should” condition, provide canopies at the ID check areas. Providing an overhead canopy at the ID check area can:

- Improve lighting
- Protect guards and drivers from inclement weather
- Serve as a platform for traffic control devices, signage and security equipment
- Be used as a structure to mount lane use indications

- Be a gateway to encourage lower speeds

When canopies are installed, they should provide:

- Cover for the entire I.D. check area (inbound lanes)
- Protection for all potential guard positions
- Proper overhang
- Lane control signals in all lanes, similar to toll collection or parking facilities, to inform incoming vehicles of the current lane status
- Lane control signals for outbound traffic where reversible lanes are utilized

According to Section 6.7 of SDDCTEA Pamphlet 55-15, the minimum desirable clear height shall be 17.5 feet to support common vehicle heights and facilitate the use of the overhead canopy for lighting or security equipment. The clear height shall be measured from the pavement to the lowest point on the overhead canopy, including light fixtures and other equipment. Structural elements of the canopy should be strategically located where possible behind attenuators or barrier walls and should be placed at least two feet behind the face of curb.

4. DATA COLLECTION

This section summarizes the recorded traffic volumes for each intersection. A total of 6 intersections were counted and evaluated for this study. In addition, 24-hour traffic volumes were captured at three roadway locations and three ACP locations (Plainview Gate, Dexter Gate, and Stark Gate). A general overview of the ACP and TMC locations are shown in exhibit 4.1 and the three additional roadway ATR locations are shown in exhibit 4.2.

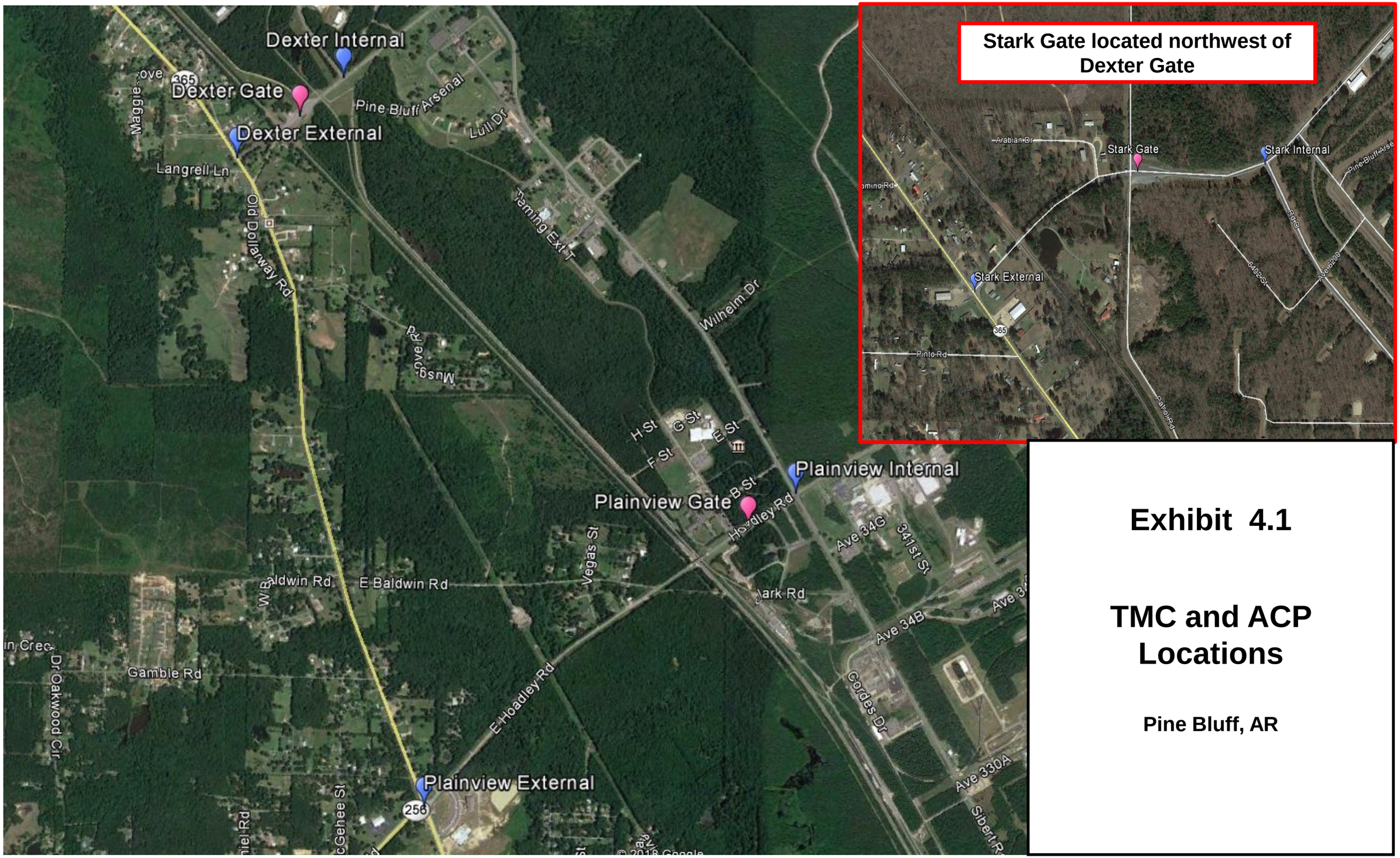


Exhibit 4.1

TMC and ACP Locations

Pine Bluff, AR

Exhibit 4.2

Roadway ATR Locations

Pine Bluff, AK

4.1. Existing ACP Volumes and Queues

The study team collected traffic data at the ACPs to determine ACP utilization and to determine the required number of processing lanes. Traffic counters were placed in the inbound and outbound lanes within the installation to determine vehicle classification and vehicle volume in 15-minute increments. Traffic queues were also observed during the morning peak period to obtain the true demand at the gate.

4.1.1. 24-hour Traffic Volumes

Traffic counters were placed in the inbound and outbound lanes of all three ACPs within the installation. The traffic counters recorded data for a 48-hour period from Tuesday, 27 February 2018 to Wednesday, 28 February 2018 to provide two days of 24-hour (15-minute interval) counts. Exhibit 4.3 shows the recorded 24-hour traffic volumes for the gates.

Exhibit 4.3 24-hour Volume Summary

ACP	2-27-18	2-28-18
Plainview Gate Inbound	668	609
Plainview Gate Outbound	688	653
Dexter Gate Inbound	381	365
Dexter Gate Outbound	393	366
Stark Gate Inbound	332	345
Stark Gate Outbound	342	348

4.1.2. Existing Traffic Demand

Queue observations were conducted during morning peak periods to coincide with the morning peak period of the ATR counts. The queues at the end of each 15-minute interval were documented to help assess the true design demand at the ACP. A summary of the inbound 15-minute volumes and remaining ACP queues are shown in the tables.

To calculate the inbound arrival volume at each ACP, or the existing demand, the change in queue length (i.e. Delta Q) is added to the inbound departure volume (i.e. processed volume). The inbound departure volume is simply the inbound volume that was processed at the ID check area during the 15-minute count interval. Delta Q is the net change in queue length for the current 15-minute interval queue (i.e. $Q15_{final}$) and the previous 15-minute interval queue (i.e. $Q15_{initial}$). The following tables show the collected inbound departure volume, observed queues at the end of each 15-minute interval, the calculated Delta Q volume, and the calculated resulting inbound arrival volumes. The calculated inbound arrival volume represents the existing demand for the given 15-

minute interval. The peak 15-minute arrival volume, in the determined peak hour period, has been highlighted in yellow for each ACP.

Plainview Gate Arrival Volume Calculations

Interval	Departure Volume (Processed Vehicle Count)	Queue (Vehicles)	Delta Q ($Q15_{final}$-$Q15_{initial}$)	Arrival Volume (Departure Volume + Delta Q)
0530-0545	19	0	0	19
0545-0600	36	0	0	36
0600-0615	50	1	1	51
0615-0630	64	0	-1	63
0630-0645	34	0	0	34
0645-0700	21	0	0	21
0700-0715	33	0	0	33
0715-0730	12	0	0	12
0730-0745	20	0	0	20

Dexter Gate Arrival Volume Calculations

Interval	Departure Volume (Processed Vehicle Count)	Queue (Vehicles)	Delta Q ($Q15_{final}$-$Q15_{initial}$)	Arrival Volume (Departure Volume + Delta Q)
0515-0530	8	0	0	8
0530-0545	7	0	0	7
0545-0600	17	3	3	20
0600-0615	33	3	0	33
0615-0630	53	0	-3	50
0630-0645	19	0	0	19
0645-0700	11	0	0	11
0700-0715	11	0	0	11

Stark Gate Arrival Volume Calculations

Interval	Departure Volume (Processed Vehicle Count)	Queue (Vehicles)	Delta Q ($Q15_{final}$-$Q15_{initial}$)	Arrival Volume (Departure Volume + Delta Q)
0615-0630	32	0	0	32
0630-0645	41	0	0	41
0645-0700	36	0	0	36
0700-0715	14	0	0	14
0715-0730	29	0	0	29
0730-0745	25	0	0	25
0745-0800	46	0	0	46
0800-0815	14	0	0	14

To calculate the existing demand volume, the highest 15-minute inbound arrival volume was multiplied by 4 to account for the peak hour factor. A summary of these calculations is provided below in exhibit 4.4.

Exhibit 4.4 Existing Demand Volume Calculation Summary

ACP	Peak 15-Minute Inbound Arrival Volume	15-Minute Intervals/ Hour	Existing Demand Volume
Plainview Gate	63	4	252
Dexter Gate	50	4	200
Stark Gate	46	4	184

4.2. Existing Roadway Volumes

This section summarizes the traffic data that was collected by the study team, including 24-hour traffic volume at each study roadway location, intersection lane configurations, and turning movement counts at each study intersection.

4.2.1. 24-hour Traffic Volumes

Traffic counters were placed at three different roadway locations within the installation. The traffic counters recorded data for a 48-hour period from Tuesday, 27 February 2018 to Wednesday, 28 February 2018. Exhibit 4.5 shows the recorded 24-hour traffic volumes and peak hour volumes for AM, MID, and PM periods for each roadway location.

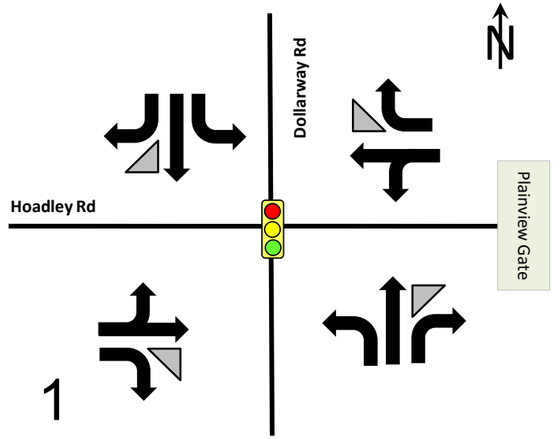
Exhibit 4.5 24-hour Volume Summary

Location	Direction	Time Period	Volume for 2-27	Volume for 2-28
#1 – Hoadley	EB	AM	104	103
		MID	45	52
		PM	31	21
		24-hr	462	436
	WB	AM	35	34
		MID	53	46
		PM	119	121
		24-hr	445	422
#2 - Sibert	NB	AM	71	60
		MID	69	52
		PM	39	35
		24-hr	512	474
	SB	AM	47	46
		MID	50	56
		PM	72	77
		24-hr	587	520
#3 – Atkisson	NB	AM	72	65
		MID	50	49
		PM	21	19
		24-hr	380	339
	SB	AM	31	30
		MID	46	49
		PM	77	61
		24-hr	381	338

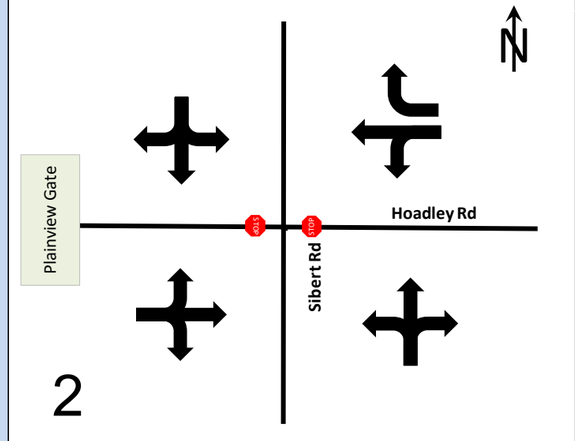
4.2.2. Intersection Lane Configurations and Traffic Volumes

Exhibit 4.6 shows the lane configuration diagrams and traffic control for each study intersection. To evaluate traffic operations at the intersections, manual intersection turning movement counts (TMC) were conducted. The TMCs were conducted during the morning, midday, and evening peak hours, and the peak hour turning movement counts are summarized in exhibit 4.7.

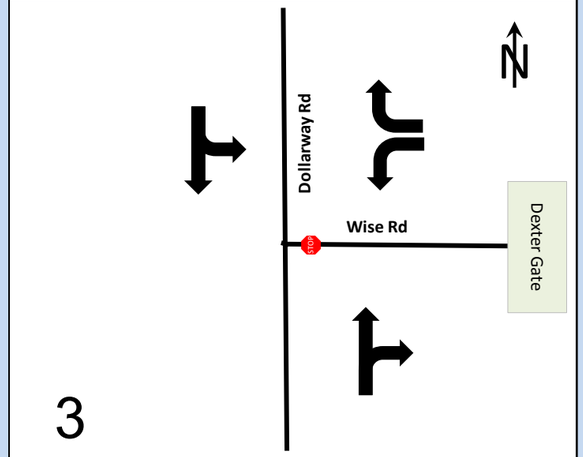
Hoadley Rd and Dollarway Rd (Plainview Gate External)



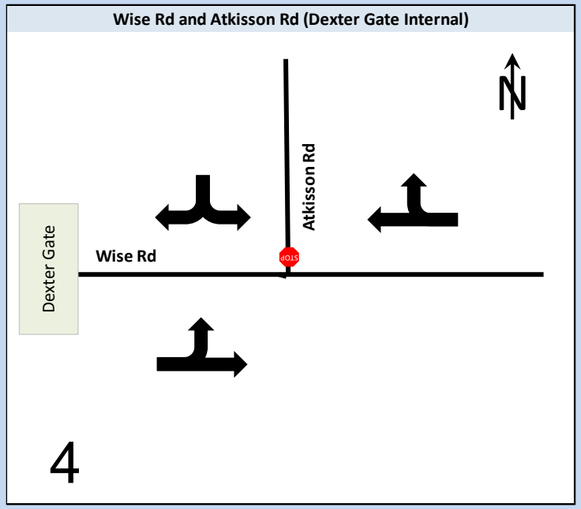
Hoadley Rd and Sibert Rd (Plainview Gate Gate Internal)



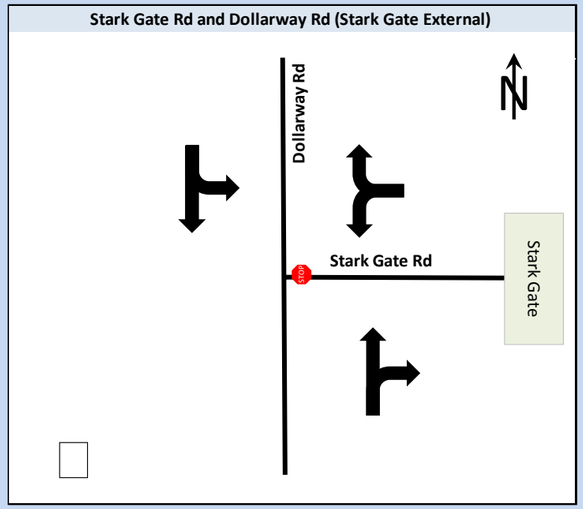
Wise Rd and Dollarway Rd (Dexter Gate External)



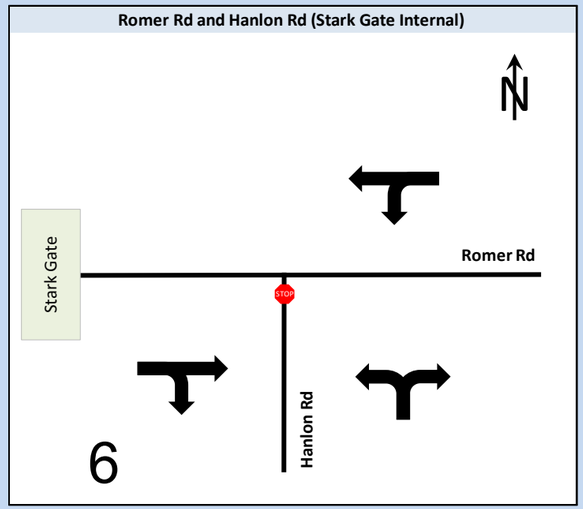
Wise Rd and Atkisson Rd (Dexter Gate Internal)



Stark Gate Rd and Dollarway Rd (Stark Gate External)



Romer Rd and Hanlon Rd (Stark Gate Internal)

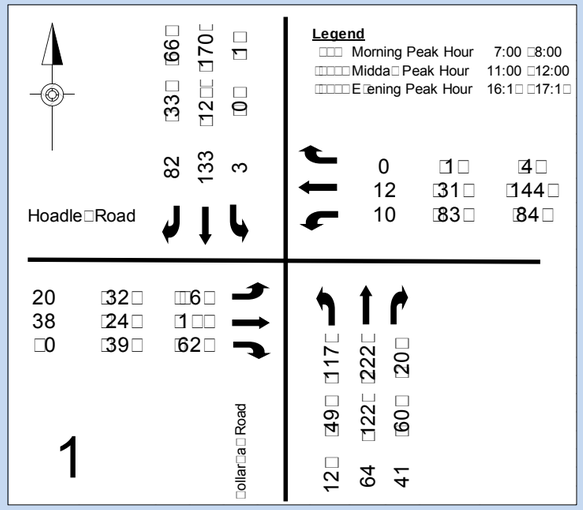


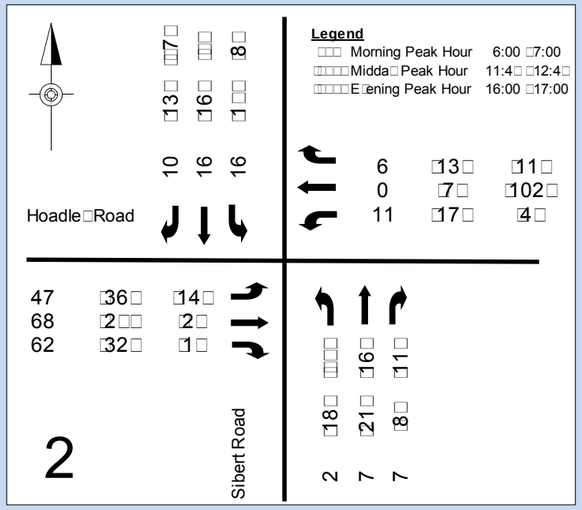
Gannett Fleming

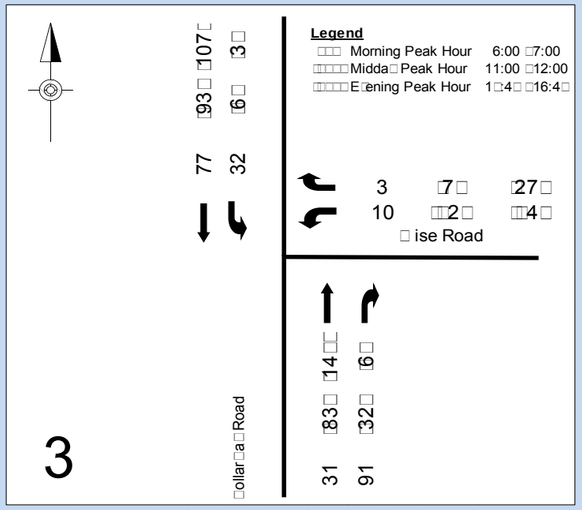
Exhibit 4.6

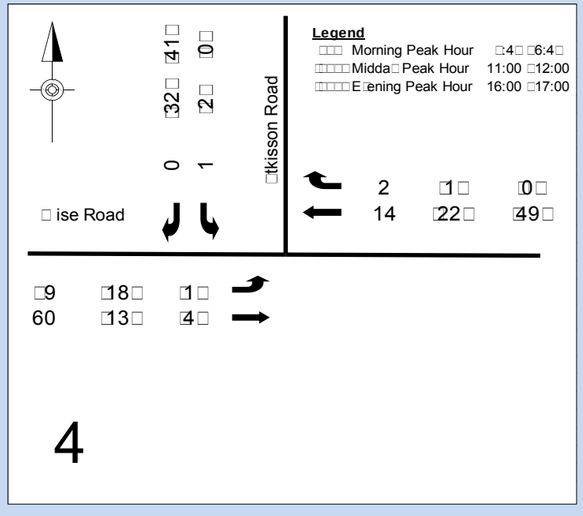
Existing Lane Configurations

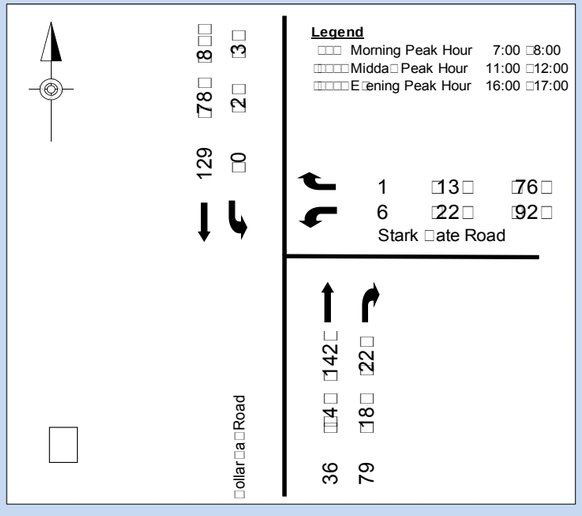
Pine Bluff Arsenal, AR











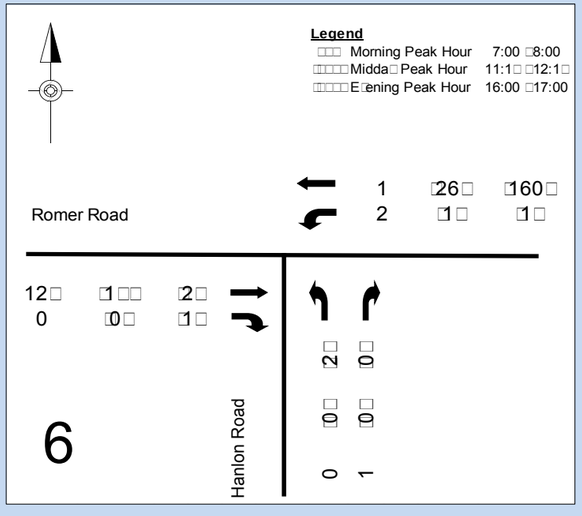


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Exhibit 4.7

Existing Traffic Volumes

Pine Bluff Arsenal, AR

5. TRANSPORTATION PLANNING CONSIDERATIONS

This section discusses future development within the installation and the surrounding area that will impact future traffic conditions.

5.1. Future Traffic Considerations

5.1.1. External Growth

Pine Bluff Arsenal is in Jefferson County, Arkansas. Jefferson County's population has been decreasing over the past five years and population is expected to continue to decline. Therefore, no additional growth factor was added to the traffic movements on the external roadways that public traffic utilizes.

5.1.2. Internal Growth

No personnel were deployed at the time of the study. No future growth is expected on the base within the next ten years. Therefore, no growth factor was applied to the installation's traffic volumes.

6. INTERSECTION ANALYSIS

This section discusses the studied intersections inclusive of observations and existing deficiencies at the intersections, the operations analysis for existing and future conditions, improvements that could be made to address some deficiencies, and long-term improvements to address remaining deficiencies and congestion associated with the future traffic conditions.

6.1. Common Deficiencies

The deficiencies listed below were found at most of the study locations and can be addressed in the short-term.

Photo	Deficiency/Corrective Action
	Deficiencies: Some sign posts on the installation are fixed posts which are a roadside hazard. Although some of the posts are seemingly protected from errant vehicles behind a curb, curbs are generally recognized as having no significant containment or redirection capability. Refer to Chapter IV of FHWA's publication, Maintenance of Signs and Sign Supports, 2010 for more information on breakaway posts. https://safety.fhwa.dot.gov/local_rural/training/fhwasa09025/fhwasa09025.pdf **Corrective Actions:** Replace all fixed posts with posts that utilize a breakaway design. Several breakaway designs are discussed in section 3.2.2.1 of this report.

Photo	Deficiency/Corrective Action
 	Deficiencies: Type I sheeting is prevalent throughout the installation. All regulatory, warning, and guide signs with a green background should utilize Type III or higher sheeting. This sheeting provides levels of retroreflectivity to ensure the signs can be seen during nighttime or low-light conditions. Refer to Section 2A.08 of the MUTCD for standards and guidance relating to maintaining minimum retroreflectivity. The Federal Highway Administration (FHWA) also provides a retroreflective sheeting guide to help identify sheeting types: https://safety.fhwa.dot.gov/roadway_dept/night_visib/sign_visib/sheetguide/ In addition, the minimum size for a STOP sign is 30”x30”. The minimum size for a speed limit sign should be 24”x30”. **Corrective Actions:** Replace all signs that utilize Type I sheeting and any signs that have poor retroreflectivity. Additionally, replace all STOP signs that have dimensions less than 30”x30”. SDDCTEA can assist with sign compliance by conducting a Sign Management Study if necessary.

6.2. Intersection Existing Conditions and Deficiencies

6.2.1. Hoadley Road and Dollarway Road (Plainview Gate External)

Eastbound Approach

Westbound Approach

Northbound Approach

Southbound Approach

The following existing conditions were noted during field evaluations:

Speed Limit	▪ 40 mph westbound on Hoadley Road ▪ 45 mph eastbound on Hoadley Road ▪ 45 mph on Dollarway Road
Intersection lighting	▪ Luminaires at southwest and northeast corners
Signing	▪ Signs throughout the intersection are mounted on fixed posts and are not retroreflective ▪ The YIELD signs and DO NOT ENTER signs are mounted back-to-back on the same post for each intersection approach ▪ Different KEEP RIGHT signs are used for the eastbound and westbound approaches. Each sign is mounted back-to-back with an additional KEEP RIGHT sign to face each directional of travel ▪ A YIELD sign is used for the channelized right turn on the eastbound approach ▪ No lane use control signage is used
Pavement markings	▪ Medians are not flush ▪ Pavement markings are faded throughout the intersection ▪ No stop lines are present for each approach lane
Design Vehicle Accommodations	▪ Multiple turn radii are too tight to accommodate commercial vehicles and trucks
Roadside Hazards	▪ None
Bike and pedestrian access	▪ Curb cuts are present on the southern leg where pedestrian crossing is not permitted
Traffic Control	▪ Signalized intersection ▪ Northbound and Southbound – protected/permitted ▪ Eastbound and Westbound - permitted
Operational Notes	▪ None

6.2.1.1. Corrective Actions

Photo	Deficiency/Corrective Action
	Deficiencies: The YIELD signs and DO NOT ENTER signs are mounted back-to-back on the same post for each intersection approach. This blocks the silhouette of the YIELD sign which makes it more difficult to identify. **Corrective Actions:** Mount each sign on its own separate breakaway post.
 	Deficiencies: Different KEEP RIGHT signs are used for the eastbound and westbound approaches. Each sign is mounted back-to-back with an additional KEEP RIGHT sign to face each directional of travel. Consistent KEEP RIGHT signs should be used for the entire intersection. **Corrective Actions:** Replace the KEEP RIGHT sign shown in the bottom photo with a R4-7 sign. R4-7 Mount the KEEP RIGHT signs on their own separate breakaway post and install on the nose of the median in the direction which vehicles are traveling.

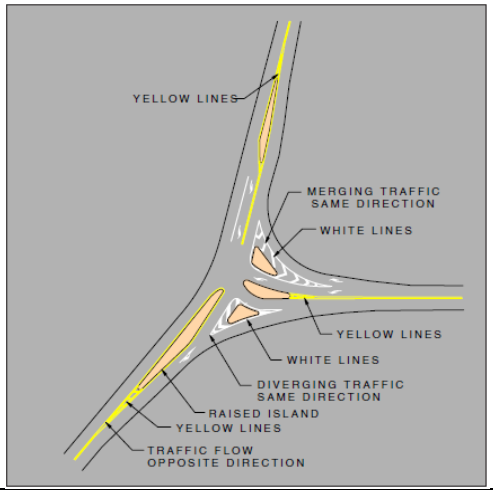
Photo	Deficiency/Corrective Action
	Deficiencies: Curb cuts are present on the southern leg where pedestrian crossing is not permitted. **Corrective Actions:** Remove the curb cuts. Pedestrian crossing is not permitted at these locations.
	Deficiencies: The painted islands are not properly delineated around the raised concrete islands. The northwest corner channelizing island should have a raised concrete island like the rest. **Corrective Actions:** Install a concrete channelizing island at the northwest corner of the intersection. Stripe the area around the channelizing islands as shown in the photo below. Hatching should be oriented such that it directs a vehicle back into its desired travel lane. 

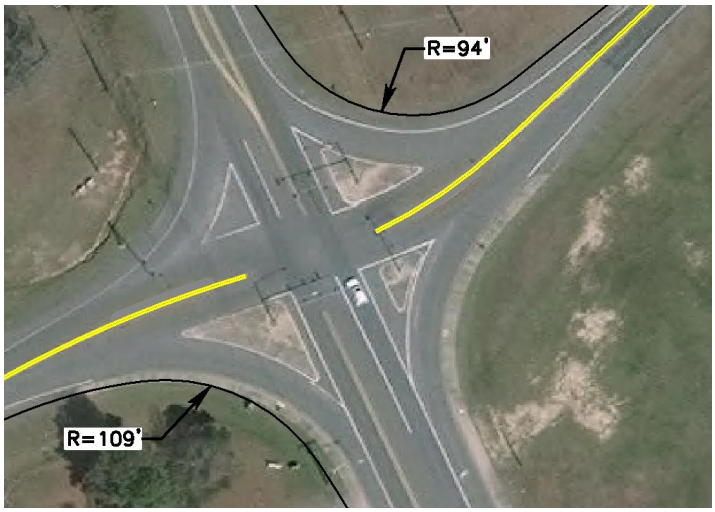
Photo	Deficiency/Corrective Action
	Deficiencies: A YIELD sign is used for the channelized right turn on the eastbound approach. **Corrective Actions:** Remove the YIELD sign. This is a free movement since the eastbound channelized right turn lane joins an added lane.
	Deficiencies: No lane use control signage is used. **Corrective Actions:** Install lane use control signage on the signal mast arms and in advance of the intersection for the northbound and southbound approaches. The northbound approach signs show a left, through, and right turn movement. The southbound approach should show a left and a shared through/right turn movement.
	Deficiencies: Pavement markings are faded throughout the intersection. **Corrective Actions:** Restripe the faded pavement markings for proper visibility.

Photo	Deficiency/Corrective Action
	Deficiencies: No stop lines are present for each approach lane. **Corrective Actions:** Stripe a stop line for each approach lane to indicate the point behind which vehicles are required to stop for the traffic signal.

Deficiencies:
Multiple turn radii are too tight to accommodate commercial vehicles and trucks.

Corrective Actions:
Slightly modify the turn radii and remove the median islands at the eastbound and westbound approaches as shown in the photo.

Photo



6.2.2. Hoadley Road and Sibert Road (Plainview Gate Internal)

Eastbound Approach

Westbound Approach

Northbound Approach

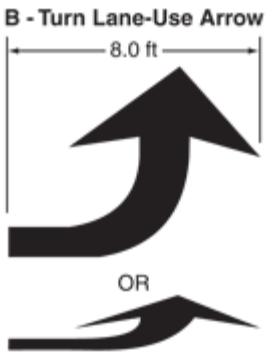
Southbound Approach

The following existing conditions were noted during field evaluations:

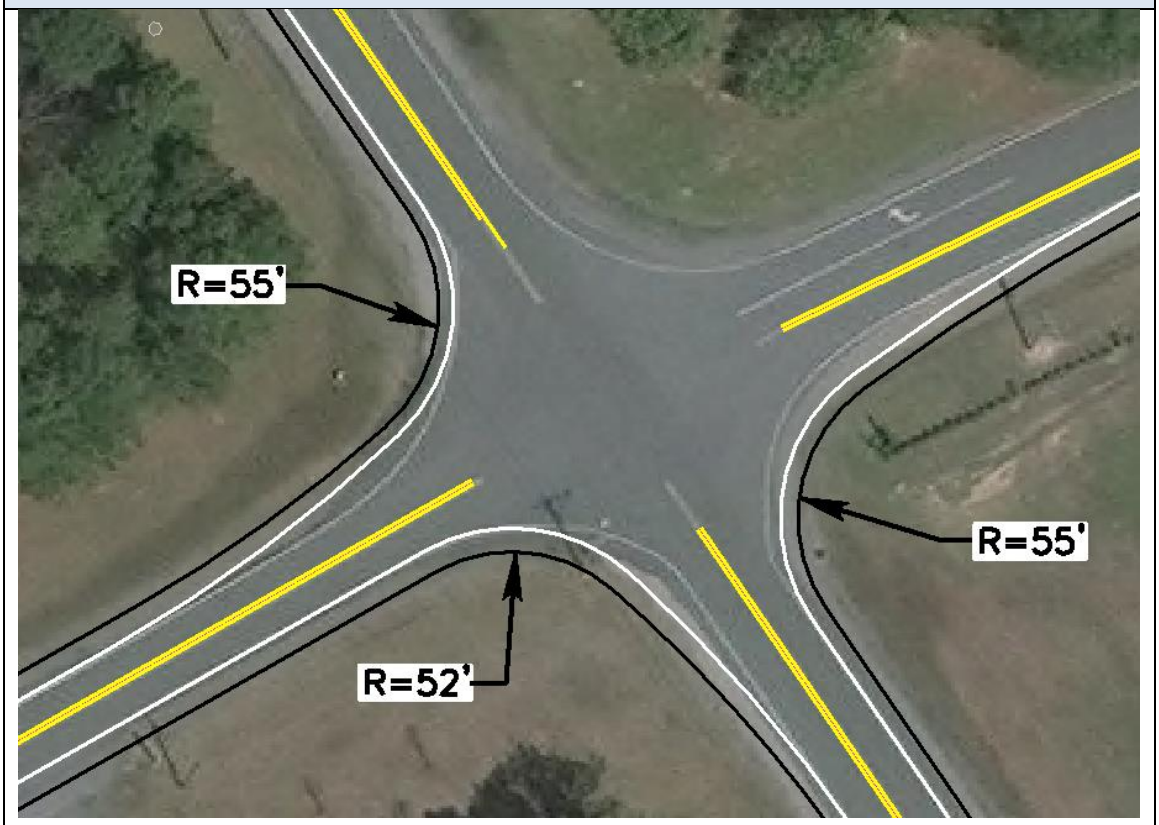
Speed Limit	▪ 35 mph on Hoadley Road ▪ 40 mph on Sibert Road
Intersection lighting	▪ Inadequate lighting
Signing	▪ The westbound approach STOP sign has a WELCOME sign mounted below ▪ Several signs throughout the intersection are mounted on fixed posts ▪ The TRUCK ROUTE sign is faded and is mounted too low which makes it hard to read ▪ The text on the wayfinding sign is difficult to read since it is faded and is less than the minimum text height ▪ There are also too many locations ▪ The speed limit signs on the southern and eastern leg are too small, not retroreflective, and are mounted too low
Pavement markings	▪ The arrow marking is broken and faded
Design Vehicle Accommodations	▪ Multiple turn radii are too tight to accommodate commercial vehicles and trucks
Roadside Hazards	▪ None
Bike and pedestrian access	▪ None
Traffic Control	▪ Stop-controlled on eastbound and westbound approaches
Operational Notes	▪ None

6.2.2.1. Corrective Actions

Photo	Deficiency/Corrective Action
	Deficiencies: The westbound approach STOP sign has a WELCOME sign mounted below. **Corrective Actions:** Relocate the WELCOME sign that supplements the eastbound approach STOP sign since it is not related to the regulatory STOP sign.
	Deficiencies: The TRUCK ROUTE sign is faded and is mounted too low which makes it difficult to read. **Corrective Actions:** Replace the TRUCK ROUTE sign with a new Type III sheeting TRUCK ROUTE sign that is 24”x18” and is mounted to a height of at least 5 feet.

Photo	Deficiency/Corrective Action
	Deficiencies: The text on the wayfinding sign is difficult to read since it is faded and is less than the minimum text height. There are also too many locations. **Corrective Actions:** Replace the sign with multiple wayfinding signs that have a maximum of three destinations. Ensure the wayfinding signs are up to date. Section 2D.06 of the MUTCD states that on low-volume roads with speeds of 25 mph or less, and on urban streets with speeds of 25 mph or less, the principal legend shall be in letters at least 4 inches in height for all upper-case letters, or a combination of 4 inches in height for upper-case letters and 3 inches in height for lower-case letters.
	Deficiencies: The arrow marking is broken and faded. **Corrective Actions:** Restripe the arrow marking as shown below. 

Deficiency/Corrective Action
Deficiencies: Multiple turn radii are too tight to accommodate commercial vehicles and trucks. **Corrective Actions:** Slightly modify the turn radii as shown in the photo.
Photo



6.2.3. Wise Road and Dollarway Road (Dexter Gate External)

Westbound Approach

Northbound Approach

Southbound Approach

The following existing conditions were noted during field evaluations:

Speed Limit	▪ 55 mph on Hoadley Road
Intersection lighting	▪ Inadequate lighting
Signing	▪ A STOP sign is used on the left-hand side of the roadway for the westbound approach
Pavement markings	▪ No lane use arrow markings are used for the westbound approach
Design Vehicle Accommodations	▪ Multiple turn radii are too tight to accommodate commercial vehicles and trucks
Roadside Hazards	▪ There is a slight shoulder drop-off on the northbound approach
Bike and pedestrian access	▪ None
Traffic Control	▪ Stop-controlled on westbound approach
Operational Notes	▪ None

6.2.3.1. Corrective Actions

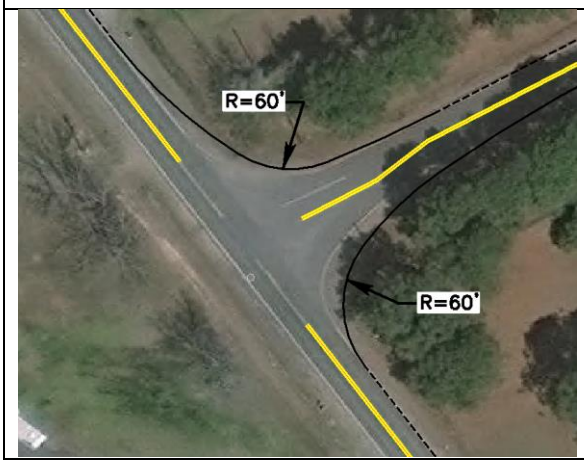
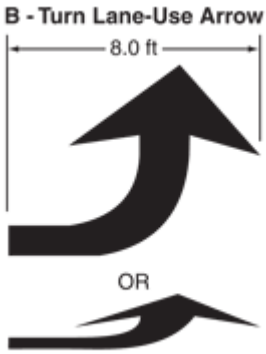
Photo	Deficiency/Corrective Action
	Deficiencies: There is a slight shoulder drop-off on the northbound approach. **Corrective Actions:** Backfill the shoulder area to create a smooth transition from roadway to shoulder.
	Deficiencies: A STOP sign is used on the left-hand side of the roadway for the westbound approach. **Corrective Actions:** Remove this STOP sign. A STOP sign is not needed on the left-hand side of the roadway in this situation. Instead, increase the right-hand side STOP sign to a size of 48”x48” and install a red, vertical retroreflective strip on the post to increase conspicuity.
	**Deficiencies:** Multiple turn radii are too tight to accommodate commercial vehicles and trucks. **Corrective Actions:** Modify the turn radii as shown in the photo. It should be noted that if the commercial vehicle inspection area is relocated to the Plainview Gate, the radii improvements will not be needed.

Photo	Deficiency/Corrective Action
	Deficiencies: No lane use arrow markings are used for the westbound approach and there is no stop line. **Corrective Actions:** Install compliant lane use arrow markings for the left and right turn lanes as shown below. Install a stop line. 

6.2.4. Wise Road and Atkisson Road (Dexter Internal)

Eastbound Approach

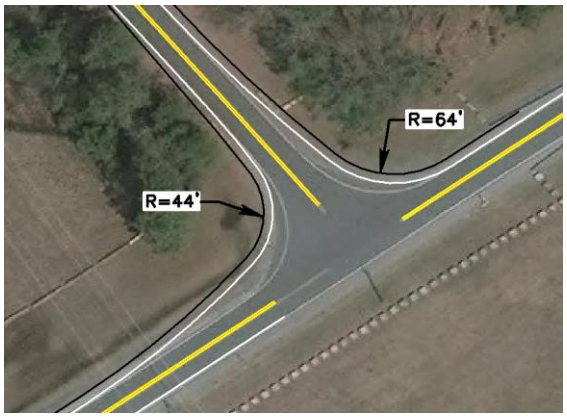
Westbound Approach

Southbound Approach

The following existing conditions were noted during field evaluations:

Speed Limit	▪ 25 mph on Wise Road
Intersection lighting	▪ No lighting
Signing	▪ The swing gate is not properly delineated
Pavement markings	▪ Adequate
Design Vehicle Accommodations	▪ Multiple turn radii are too tight to accommodate commercial vehicles and trucks
Roadside Hazards	▪ There is a significant shoulder drop-off for vehicles making a right turn from Atkisson Road
Bike and pedestrian access	▪ None
Traffic Control	▪ Stop-controlled on southbound approach
Operational Notes	▪ None

6.1.4.1 Corrective Actions

Photo	Deficiency/Corrective Action
	Deficiencies: The swing gate is not properly delineated. **Corrective Actions:** The swing gate should be delineated with horizontal panels with retroreflective, alternating, vertical red/white stripes. Install a ROAD CLOSED sign mounted on the gate. Delineate the post since it is located within the clear zone.
	Deficiencies: There is a significant shoulder drop-off for vehicles making a right turn from Atkisson Road. **Corrective Actions:** Backfill the shoulder area so vehicles can avoid this roadside hazard.
	**Deficiencies:** Multiple turn radii are too tight to accommodate commercial vehicles and trucks. **Corrective Actions:** Modify the turn radii as shown in the photo. It should be noted that if the commercial vehicle inspection area is relocated to the Plainview Gate, the radii improvements will not be needed.

6.2.5. Stark Gate Road and Dollarway Road (Stark Gate External)

Westbound Approach

Northbound Approach

Southbound Approach

The following existing conditions were noted during field evaluations:

Speed Limit	▪ 45 mph on Dollarway Road
Intersection lighting	▪ No lighting
Signing	▪ The westbound approach STOP sign uses Type I sheeting and is mounted on a fixed post ▪ An old post remains that contains no signing
Pavement markings	▪ The broken, yellow centerline is faded. Passing is permitted near the intersection
Design Vehicle Accommodations	▪ Adequate
Roadside Hazards	▪ There is a slight drop-off from the new driveway to the shoulder on both ends of the driveway
Bike and pedestrian access	▪ None
Traffic Control	▪ Stop-controlled on westbound approach
Operational Notes	▪ None

6.1.5.1 Corrective Actions

Photo	Deficiency/Corrective Action
	Deficiencies: An old post remains that contains no signing and is a fixed object hazard. **Corrective Actions:** Remove the post.
	Deficiencies: There is a slight drop-off from the new driveway to the shoulder on both ends of the driveway. **Corrective Actions:** Backfill the shoulder so that the shoulder is level with the driveway. This will create a smooth transition from shoulder to driveway.
	Deficiencies: The broken, yellow centerline is faded. Passing is permitted near this intersection and this should not be allowed. **Corrective Actions:** Restripe the centerline for proper visibility. The centerline should be striped as a double yellow centerline since passing should not be permitted near an intersection.

6.2.6. Romer Road and Hanlon Road (Stark Gate Internal)

Eastbound Approach

Westbound Approach

Northbound Approach

The following existing conditions were noted during field evaluations:

Speed Limit	▪ 35-mph on Romer Road
Intersection lighting	▪ No lighting
Signing	▪ The STOP sign is mounted too low, is not retroreflective, and is mounted on a fixed post
Pavement markings	▪ Adequate
Design Vehicle Accommodations	▪ Adequate
Roadside Hazards	▪ The light pole is located within the clear zone of the roadway
Bike and pedestrian access	▪ None
Traffic Control	▪ Stop-controlled on northbound approach
Operational Notes	▪ None

6.1.6.1 Corrective Actions

Photo	Deficiency/Corrective Action
	Deficiencies: The STOP sign is mounted too low, is not retroreflective, and is mounted on a fixed post. **Corrective Actions:** Replace the STOP sign with one that uses Type III sheeting or better and mount the sign to a height of at least 5 feet on a breakaway post.
	Deficiencies: The light pole is located within the clear zone of the roadway. **Corrective Actions:** Ideally the light pole should be relocated out of the clear zone of the roadway. In the short-term, the light pole can be delineated with an OM3-R object marker. OM-3R

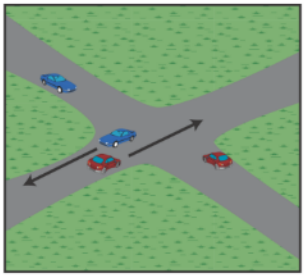
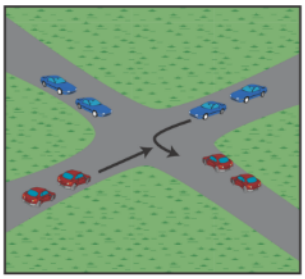
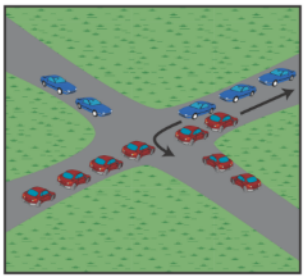
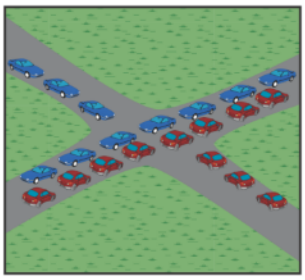
6.3. Intersection Operations Analysis

An operations analysis was conducted at study intersections under existing and future conditions using Synchro Traffic Analysis Software (Version 10). This section summarizes the existing, future no build, and future build (if necessary) operations for each intersection. Each table includes level of service (LOS) and 95th percentile queues for each lane group at the intersection.

LOS describes the operational condition of an intersection and usually falls into one of six categories: A through F. LOS A represents operating conditions with relatively little traffic and no congestion, while LOS F represents relatively high traffic and unpredictable operating conditions, including high delay and driver discomfort. Generally, a facility operating at or better than LOS D is considered acceptable. Exhibit 6.1 details and graphically shows examples and definitions of LOS A through F. The 95th percentile queue is reported because it is commonly used for determining the design length of turn lanes.

Note that the amount of delay, in seconds, is shown in parentheses for movements that have a LOS F since there is no upper bound.

Exhibit 6.1 Level of Service Definitions

LOS	INTERSECTIONS		
	SIGNALIZED		UNSIGNALIZED
A	✓ Very low delay, average less than 10.0 seconds per vehicle (spv) ✓ Most vehicles arrive during green phase ✓ Most vehicles do not need to stop		✓ Average delays less than 10.0 spv ✓ Little or no delay to minor street traffic
B	✓ Average delay in range of 10.1-20.0 spv ✓ More vehicles stop than LOS A		✓ Average delay in range of 10.1-15.0 spv ✓ Short traffic delays to minor street traffic
C	✓ Average delay in range of 20.1-35.0 spv ✓ Number of vehicles stopping is significant ✓ Cycle failures may begin to appear		✓ Average delay in range of 15.1-25.0 spv ✓ Average traffic delays to minor street traffic
D	✓ Average delay in range of 35.1-55.0 spv ✓ Congestion more noticeable ✓ Many vehicles stop ✓ Cycle failures noticeable		✓ Average delay in range of 25.1-35.0 spv ✓ Long traffic delays to minor street traffic
E	✓ Average delay in range of 55.1-80.0 spv ✓ Cycle failures frequent		✓ Average delay in range of 35.1-50.0 spv ✓ Very long delays to minor street traffic
F	✓ Average delay in excess of 80.0 spv ✓ Delay unacceptable to most drivers ✓ Many cycle failures		✓ Average delay in excess of 50.0 spv ✓ Extreme delays with queuing ✓ Congestion affects other intersections ✓ Warrants improvement to intersection

6.3.1. Hoadley Road and Dollarway Road (Plainview Gate External)

Existing Peak Operations Analysis

Movement	AM Peak LOS/95% Queue (ft)	MID Peak LOS/95% Queue (ft)	PM Peak LOS/95% Queue (ft)
EB left/thru	A/36	A/29	A/28
EB right	A/0	A/0	A/0
WB left/thru	A/13	A/39	A/111
WB right	A/0	A/0	A/0
NB left	A/26	A/19	A/43
NB thru	A/30	A/43	A/109
NB right	A/0	A/0	A/0
SB left	A/2	A/0	B/1
SB thru	B/54	A/66	B/86
SB right	A/0	A/0	A/0
Overall	A	A	B

For existing conditions, this intersection operates at an acceptable LOS for all peak periods. Thus, no improvements are necessary.

The installation noted the possibility of consolidating gates to reduce the required manpower needed. This idea conforms with the Area Development Plan which involves relocating the commercial vehicle inspection to Plainview Gate. Consolidating gates will create an increased demand at the ACPs that remain open, along with their external and internal intersections. Therefore, a future operations analysis was completed for each intersection that would be affected by an increase in traffic volume. The future operations analysis for both Scenario 2 (closing Stark Gate) and Scenario 3 (a single combined gate at either the Dexter Gate or the Plainview Gate) are shown for both the Plainview and Dexter external and internal intersections. Additional detail for both Scenario 2 and 3 can be found in section 7.5. It is also important to note actual traffic patterns resulting from the closure of one or two ACPs may differ from the patterns assumed in the analysis. To adequately analyze the change in traffic flow, an origin and destination study would need to be completed or the study intersections should be re-evaluated once the closures take place.

Future (Scenario 2) Peak Operations Analysis

Movement	AM Peak LOS/95% Queue (ft)	MID Peak LOS/95% Queue (ft)	PM Peak LOS/95% Queue (ft)
EB left/thru	B/31	A/30	A/41
EB right	A/0	A/0	A/0
WB left/thru	A/16	A/54	B/113
WB right	A/0	A/0	A/0
NB left	A/28	A/17	A/43
NB thru	A/30	A/34	A/111
NB right	A/0	A/0	A/0
SB left	A/2	A/0	A/2
SB thru	A/54	A/57	B/88
SB right	A/0	A/0	A/0
Overall	A	A	A

Future (Scenario 3) Peak Operations Analysis

Movement	AM Peak LOS/95% Queue (ft)	MID Peak LOS/95% Queue (ft)	PM Peak LOS/95% Queue (ft)
EB left/thru	B/30	A/30	A/41
EB right	A/0	A/0	A/0
WB left/thru	B/15	A/54	B/113
WB right	A/0	A/0	A/0
NB left	A/28	A/17	A/43
NB thru	A/30	A/56	A/111
NB right	A/0	A/0	A/0
SB left	A/55	A/19	A/17
SB thru	A/53	A/57	B/88
SB right	A/0	A/0	A/0
Overall	A	A	A

This intersection operates at an acceptable LOS for all peak periods under scenario 2 and 3. Thus, no improvements are necessary.

6.3.2. Hoadley Road and Sibert Road (Plainview Gate Internal)

Existing Peak Operations Analysis

Movement	AM Peak LOS/95% Queue (ft)	MID Peak LOS/95% Queue (ft)	PM Peak LOS/95% Queue (ft)
EB left/thru/right	B/38	B/15	B/5
WB left/thru	B/3	B/5	C/48
WB right	A/0	A/3	A/3
NB left/thru/right	A/0	A/3	A/3
SB left/thru/right	A/3	A/0	A/0
Overall	A	A	A

For existing conditions, this intersection operates at an acceptable LOS for all peak periods. Thus, no improvements are necessary.

Future (Scenario 2) Peak Operations Analysis

Movement	AM Peak LOS/95% Queue (ft)	MID Peak LOS/95% Queue (ft)	PM Peak LOS/95% Queue (ft)
EB left/thru/right	B/20	A/10	B/3
WB left/thru	B/3	B/3	B/15
WB right	A/0	A/0	A/0
NB left/thru/right	A/0	A/0	A/3
SB left/thru/right	A/0	A/0	A/0
Overall	A	A	A

Future (Scenario 3) Peak Operations Analysis

Movement	AM Peak LOS/95% Queue (ft)	MID Peak LOS/95% Queue (ft)	PM Peak LOS/95% Queue (ft)
EB left/thru/right	B/75	B/18	B/5
WB left/thru	B/3	B/3	C/25
WB right	A/0	A/0	A/0
NB left/thru/right	A/0	A/0	A/5
SB left/thru/right	A/0	A/0	A/0
Overall	B	A	A

This intersection operates at an acceptable LOS for all peak periods under scenario 2 and 3. Thus, no improvements are necessary.

6.3.3. Wise Road and Dollarway Road (Dexter Gate External)

Existing Peak Operations Analysis

Movement	AM Peak LOS/95% Queue (ft)	MID Peak LOS/95% Queue (ft)	PM Peak LOS/95% Queue (ft)
WB left	B/3	B/13	B/15
WB right	A/0	A/0	A/5
NB thru/right	A/0	A/0	A/0
SB left/thru	A/3	A/0	A/0
Overall	A	A	A

For existing conditions, this intersection operates at an acceptable LOS for all peak periods. Thus, no improvements are necessary.

Future (Scenario 2) Peak Operations Analysis

Movement	AM Peak LOS/95% Queue (ft)	MID Peak LOS/95% Queue (ft)	PM Peak LOS/95% Queue (ft)
WB left	B/3	B/8	B/8
WB right	A/0	A/5	B/23
NB thru/right	A/0	A/0	A/0
SB left/thru	A/10	A/3	A/3
Overall	A	A	A

Future (Scenario 3) Peak Operations Analysis

Movement	AM Peak LOS/95% Queue (ft)	MID Peak LOS/95% Queue (ft)	PM Peak LOS/95% Queue (ft)
WB left	B/8	B/28	C/70
WB right	A/3	A/5	B/25
NB thru/right	A/0	A/0	A/0
SB left/thru	A/10	A/3	A/3
Overall	A	A	A

This intersection operates at an acceptable LOS for all peak periods under scenario 2 and 3. Thus, no improvements are necessary.

6.3.4. Wise Road and Atkisson Road (Dexter Gate Internal)

Existing Peak Operations Analysis

Movement	AM Peak LOS/95% Queue (ft)	MID Peak LOS/95% Queue (ft)	PM Peak LOS/95% Queue (ft)
EB left/thru	A/5	A/3	A/0
WB thru/right	A/0	A/0	A/0
SB left/right	B/0	A/8	A/5
Overall	A	A	A

For existing conditions, this intersection operates at an acceptable LOS for all peak periods. Thus, no improvements are necessary.

Future (Scenario 2) Peak Operations Analysis

Movement	AM Peak LOS/95% Queue (ft)	MID Peak LOS/95% Queue (ft)	PM Peak LOS/95% Queue (ft)
EB left/thru	A/10	A/3	A/0
WB thru/right	A/0	A/0	A/0
SB left/right	B/0	A/5	A/20
Overall	A	A	A

Future (Scenario 3) Peak Operations Analysis

Movement	AM Peak LOS/95% Queue (ft)	MID Peak LOS/95% Queue (ft)	PM Peak LOS/95% Queue (ft)
EB left/thru	A/10	A/3	A/0
WB thru/right	A/0	A/0	A/0
SB left/right	C/0	A/5	B/30
Overall	A	A	A

This intersection operates at an acceptable LOS for all peak periods under scenario 2 and 3. Thus, no improvements are necessary.

6.3.5. Stark Gate Road and Dollarway Road (Stark Gate External)

Existing Peak Operations Analysis

Movement	AM Peak LOS/95% Queue (ft)	MID Peak LOS/95% Queue (ft)	PM Peak LOS/95% Queue (ft)
WB left/right	B/3	A/8	B/28
NB thru/right	A/0	A/0	A/0
SB left/thru	A/3	A/0	A/0
Overall	A	A	A

For existing conditions, this intersection operates at an acceptable LOS for all peak periods. Thus, no improvements are necessary.

6.3.6. Romer Road and Hanlon Road (Stark Gate Internal)

Existing Peak Operations Analysis

Movement	AM Peak LOS/95% Queue (ft)	MID Peak LOS/95% Queue (ft)	PM Peak LOS/95% Queue (ft)
EB thru/right	A/0	A/0	A/0
WB left/thru	A/0	A/0	A/0
NB left/right	A/0	A/0	A/0
Overall	A	A	A

For existing conditions, this intersection operates at an acceptable LOS for all peak periods. Thus, no improvements are necessary.

7. ACCESS CONTROL POINT ANALYSIS

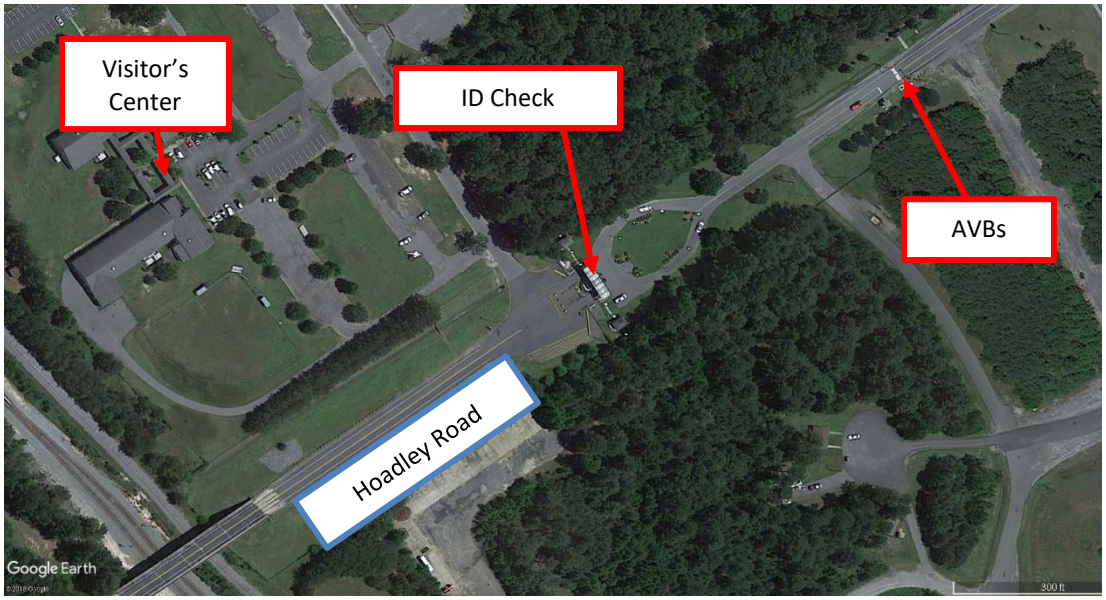
7.1. Existing Conditions

This section reviews existing conditions at the Plainview Gate, Dexter Gate, and Stark Gate.

7.1.1. Plainview Gate

The Main Gate is located on Hoadley Road to the east of Dollarway Road. Exhibit 7.1 gives an overview of the gate area.

Exhibit 7.1 Plainview Gate Overview



Usage	▪ POV Traffic
Hours of Operation	▪ 0500-1900 Monday to Friday
Number of ID check lanes	▪ One
Number of outbound lanes	▪ One
Inspection area	▪ None
Manpower during morning peak	▪ Two
Active vehicle barriers	▪ Yes
Existing inbound peak hour volume	▪ Tuesday – 184 ▪ Wednesday – 174
Processing Method	▪ Manual Processing

Approach Zone

Access Control Zone

Response Zone

Active Vehicle Barriers

Compliance Summary

Item	UFC 4-022-01 (July 2017)	SDDCTEA Pamphlet 55-15 (2014)	Existing Status
Approach Zone			
Travel Lanes	Per AASHTO/SDDCTEA Must be based on design vehicle - Pg. 29	12’ preferred (10’ min) - Pg. 3-10	1, compliant
Median	Per AASHTO/SDDCTEA - Pg. 29	Should - Pg. 3-16	Not Applicable
Transitions	Per AASHTO/SDDCTEA - Pg. 29	Per AASHTO as shown - Pg. 3-27	Not Applicable
Speed Management	Encouraged - Pg. 30	Build into design and consider others - Chp. 4	Concrete barriers used, non-compliant
Signs & Markings	Per MUTCD and SDDCTEA - Pg. 29	Per MUTCD as shown - Chp. 7	Not compliant
Advance Turnaround	Must (Design for WB-67 truck for POV only ACP) - Pg. 27 and 32	Should per UFC - Pg. 1-14	None
Random Inspection	Should - Pg3. 46-47	Shall - Pg. 6-10	None
Access Control Zone			
ID Check Islands	Must provide min. for one guard and include protection; min. 3’ setback from curb - Pg. 56	10’ lanes and 10’ islands, Impact attenuator, Notched islands, Tandem capable – Section 6.4	Not compliant
Canopy	Should - Pgs. 63-64	Should - Pg. 6-14	Present
Pedestrian Access	Consider - Pg. 31	Consider - Chp. 5	Not compliant
Post-ID Inspection	Must - Pgs. 11 and 46	Shall - Pg. 6-10	None
Post-ID Rejection	Must - Pg. 27	Should per UFC - Pg. 1-12	Present
Chase Vehicle	Provide one space close to gatehouse - Pg. 58	Should - Pg. 6-4	Present
Gatehouse	Every primary and secondary ACP must have - Pg. 57	Should - Pg. 6-4	Non-compliant

Item	UFC 4-022-01 (July 2017)	SDDCTEA Pamphlet 55-15 (2014)	Existing Status
Response Zone			
Travel Lanes	Per AASHTO/SDDCTEA Must be based on design vehicle - Pg. 29	12' preferred (10' min) - Pg. 3-10	1, compliant
Median	Per AASHTO/SDDCTEA - Pg. 29	Should - Pg. 3-16	Raised island used
Transitions	Per AASHTO/SDDCTEA - Pg. 29	Per AASHTO as shown - Pg. 3-27	Not applicable
Speed Management	Encouraged - Pg. 30	Build into design and consider others - Chp. 4	Traffic circle used
Adequate Length	Design for UFC threats and safety - Pg. 36	Shall per UFC and Army - Pg. 8-3	Not compliant
AVB Traffic Control	Must - Pg. 41	Shall - Pg. 8-7 to 8-28	Wedges
Overwatch Position	Must provide permanent or temporary - Pg. 62	Consider - Pg. 8-7	Not used
Contiguous Perimeter	Must - Pg. 26	Shall - Pg. 8-4	Not compliant
Other			
Visitor Control	Based on installation requirements - Pgs. 52-53	One per installation per UFC - Chp. 1	Yes, compliant
Truck Inspection	One per installation and segregated from POVs - Pg. 10	One per installation per UFC - Chp. 1	Not Applicable
Speed Limit & Design Speed	Per MUTCD - Pg. 30	Speed Limit of 25 mph - Pg. 7-10 Design Speed of 25 mph – Pg. 3-2	25-mph
Lighting	Must be complete and continuous - Pgs. 70-71	Should - Chp. 11	Adequate
CCTV	Must - Pg. 69	Should, as desired - Pg. 10-7	Non-compliant
Generator & UPS	Should - Pg. 64-67	Shall - Pg. 10-18	Present
ID Automation	Consider future needs - Pgs. 23-24	Consider future needs - Chp. 9	Not applicable
Func. Requirements	Should meet UFC - Pg. 10	Should, same as UFC - Pg. 1-10	Partially compliant

7.1.1.1. General Observations

In the short-term, it would not be feasible to incorporate needed enhancements required to meet UFC functional requirements (including rejection capabilities before and after the ID check), and adequate response zone treatments. However, minor enhancements can be made to enhance the overall security, safety and traffic flow while long-term needs are programmed. The following specific deficiencies were noted during field evaluations beyond the compliance summaries. Corrective actions are provided as applicable.

Photo	Deficiency/Corrective Action
	Deficiencies: The STOP AHEAD sign used in the approach zone is not compliant. The STOP AHEAD sign conveys the wrong message to drivers since they are approaching an ID checkpoint. **Corrective Actions:** Install a CHECKPOINT (W3-10A-TEA) sign supplemented by an AHEAD plaque (W16-9P). W3-10a-TEA with W16-9P

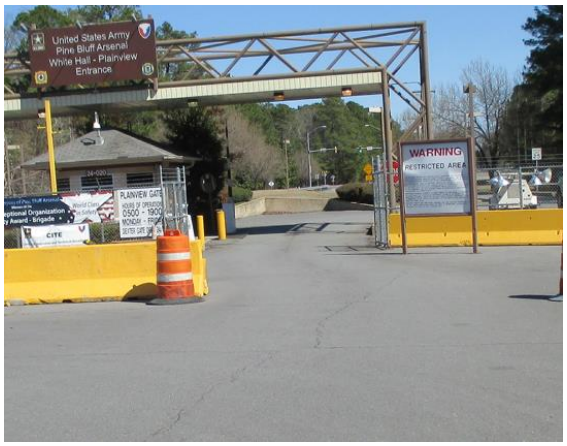
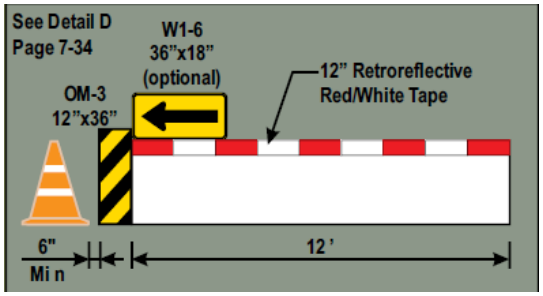
Photo	Deficiency/Corrective Action
	Deficiencies: The Visitor's sign is faded and is not legible. **Corrective Actions**: Replace the sign with a new Visitor's sign that uses white lettering on a green or brown background. The text size of the lettering should be at least 6 inch in height for upper-case letters and 4.5 inches in height for lower-case letters.
	**Deficiencies:** The concrete barriers in the approach zone are not properly delineated for both the inbound and outbound lanes. **Corrective Actions**: Reevaluate the need for concrete barriers in the approach zone. If the barriers do remain, signs and delineation should be installed per SDDCTEA Pamphlet 55-15, Exhibit 7.13. 

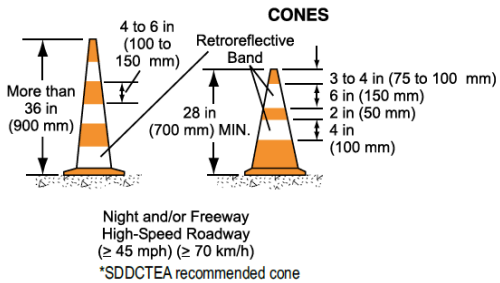
Photo	Deficiency/Corrective Action
 	Deficiencies: Czech hedgehogs, barriers, and planters are used in the approach zone to prevent vehicles from ramming into the gatehouse through the fencing. **Corrective Actions:** It is recommended to remove the Czech hedgehogs and planters and to ensure that the fencing and swing gates are reinforced. The barriers can remain but should create a chicane in accordance with SDDCTEA Pamphlet 55-15 Chapter 7.
	Deficiencies: Traffic cones used throughout the gate area not properly delineated and seem to serve no purpose. **Corrective Actions:** It is recommended to remove the traffic cones. If the cones must remain, utilize compliant traffic cones according to MUTCD standards. 

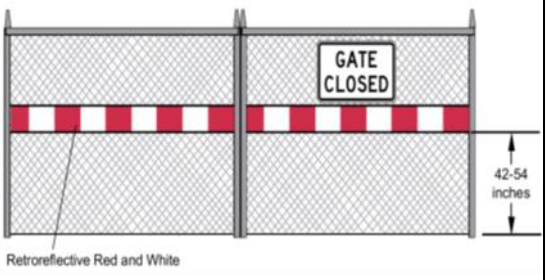
Photo	Deficiency/Corrective Action
	Deficiencies: No gate closure signage is used. **Corrective Actions:** Install gate closure signage and horizontal panels with retroreflective, alternating, vertical red/white stripes as shown below. 
	Deficiencies: A STOP sign is used at the ID check which conflicts with the guard. **Corrective Actions:** SDDCTEA does not recommend or encourage the use of STOP signs at ID check islands. If the STOP sign is desired to stay, install a supplemental plaque stating PROCEED ONLY WHEN DIRECTED BY GUARD. Both signs should use type III sheeting or better and be mounted on a breakaway post.

Photo	Deficiency/Corrective Action
	Deficiencies: Several signs throughout the gate area are mounted on fixed posts. **Corrective Actions:** Replace all fixed posts with breakaway posts since they lessen the impact to a vehicle if struck.
	Deficiencies: Boulders are used in the response zone to create a contiguous passive barrier. **Corrective Actions:** In accordance with the DoD Anti-Ram Vehicle Barrier List, boulders are not an approved type of passive barrier. Natural barriers such as boulders are not recommended since they must be specially designed and approved to stop a threat vehicle. Install an acceptable type of passive barrier from the DoD Anti-Ram Vehicle Barrier List.
	Deficiencies: The POST SPEED LIMIT sign is faded and has poor sheeting. **Corrective Actions:** Install a new POST SPEED LIMIT sign that uses Type III sheeting or better.

Photo	Deficiency/Corrective Action
	Deficiencies: The GATE EXIT SPEED sign is non-compliant. **Corrective Actions:** Install a CHECKPOINT (W3-10A-TEA) sign supplemented by an AHEAD plaque (W16-9P). W3-10a-TEA with W16-9P
	Deficiencies: Two arrow signs are turned away from the road and don't seem to be needed. **Corrective Actions:** Remove the signs.

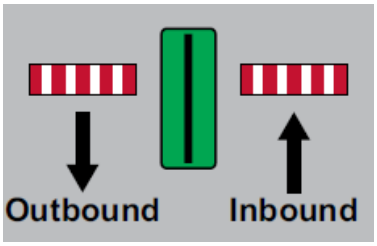
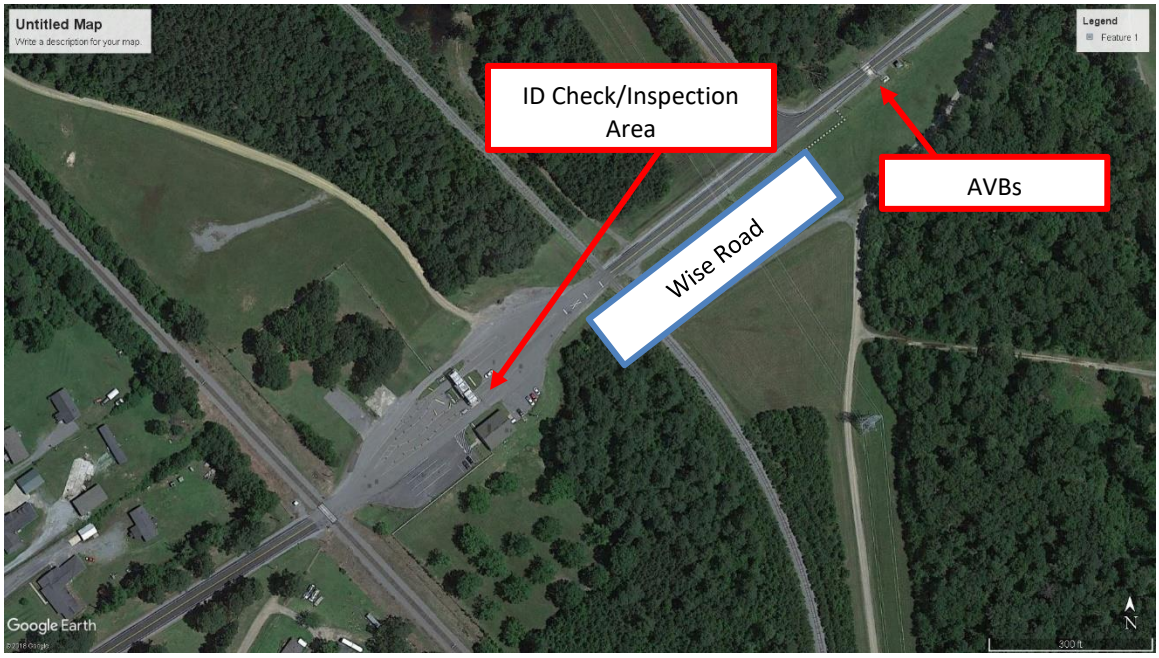
Photo	Deficiency/Corrective Action
	Deficiencies: The AVBs are not properly striped. **Corrective Actions:** Replace the old markings with alternating red and white stripes that are aligned in the direction of travel. 
	Deficiencies: Parking stoppers are used in front of the BARRIER sign. **Corrective Actions:** Remove the stoppers since they do not effectively redirect a vehicle away from the fixed object. Ideally the sign should be relocated out of the clear zone on a breakaway post. At a minimum, delineate the sign with an OM3-R object marker. OM-3R

Photo	Deficiency/Corrective Action
	Deficiencies: Pavement markings in the response zone are faded. **Corrective Actions:** Restripe the faded pavement markings for proper visibility.

7.1.2. Dexter Gate

The Dexter Gate is located on Wise Road. An overview of the gate area can be seen in exhibit 7.2.

Exhibit 7.2 Dexter Gate Overview



Usage	▪ All traffic
Hours of Operation	▪ 24/7
Number of ID check lanes	▪ Two
Number of outbound lanes	▪ Two
Inspection area	▪ Yes
Manpower during morning peak	▪ Two
Active vehicle barriers	▪ Yes
Existing inbound peak hour volume	▪ Tuesday – 128 ▪ Wednesday – 122
Processing Method	▪ Manual Processing

Approach Zone

Access Control Zone

Response Zone

Active Vehicle Barriers

Compliance Summary

Item	UFC 4-022-01 (July 2017)	SDDCTEA Pamphlet 55-15 (2014)	Existing Status
Approach Zone			
Travel Lanes	Per AASHTO/SDDCTEA Must be based on design vehicle - Pg. 29	12’ preferred (10’ min) - Pg. 3-10	2, compliant
Median	Per AASHTO/SDDCTEA - Pg. 29	Should - Pg. 3-16	Not applicable
Transitions	Per AASHTO/SDDCTEA - Pg. 29	Per AASHTO as shown - Pg. 3-27	Not compliant
Speed Management	Encouraged - Pg. 30	Build into design and consider others - Chp. 4	Barrel chicane
Signs & Markings	Per MUTCD and SDDCTEA - Pg. 29	Per MUTCD as shown - Chp. 7	Not compliant
Advance Turnaround	Must (Design for WB-67 truck for POV only ACP) - Pg. 27 and 32	Should per UFC - Pg. 1-14	Not present
Random Inspection	Should - Pg3. 46-47	Shall - Pg. 6-10	None
Access Control Zone			
ID Check Islands	Must provide min. for one guard and include protection; min. 3’ setback from curb - Pg. 56	10’ lanes and 10’ islands, Impact attenuator, Notched islands, Tandem capable – Section 6.4	Not compliant
Canopy	Should - Pgs. 63-64	Should - Pg. 6-14	Present
Pedestrian Access	Consider - Pg. 31	Consider - Chp. 5	Not present
Post-ID Inspection	Must - Pgs. 11 and 46	Shall - Pg. 6-10	Not compliant
Post-ID Rejection	Must - Pg. 27	Should per UFC - Pg. 1-12	Present
Chase Vehicle	Provide one space close to gatehouse - Pg. 58	Should - Pg. 6-4	None
Gatehouse	Every primary and secondary ACP must have - Pg. 57	Should - Pg. 6-4	Non-compliant
Response Zone			
Travel Lanes	Per AASHTO/SDDCTEA Must be based on design vehicle - Pg. 29	12’ preferred (10’ min) - Pg. 3-10	1, compliant

Item	UFC 4-022-01 (July 2017)	SDDCTEA Pamphlet 55-15 (2014)	Existing Status
Median	Per AASHTO/SDDCTEA - Pg. 29	Should - Pg. 3-16	Not applicable
Transitions	Per AASHTO/SDDCTEA - Pg. 29	Per AASHTO as shown - Pg. 3-27	Not compliant
Speed Management	Encouraged - Pg. 30	Build into design and consider others - Chp. 4	None
Adequate Length	Design for UFC threats and safety - Pg. 36	Shall per UFC and Army - Pg. 8-3	Not compliant
AVB Traffic Control	Must - Pg. 41	Shall - Pg. 8-7 to 8-28	Wedges
Overwatch Position	Must provide permanent or temporary - Pg. 62	Consider - Pg. 8-7	Present
Contiguous Perimeter	Must - Pg. 26	Shall - Pg. 8-4	Not compliant
Other			
Visitor Control	Based on installation requirements - Pgs. 52-53	One per installation per UFC - Chp. 1	Compliant
Truck Inspection	One per installation and segregated from POVs - Pg. 10	One per installation per UFC - Chp. 1	Compliant
Speed Limit & Design Speed	Per MUTCD - Pg. 30	Speed Limit of 25 mph - Pg. 7-10 Design Speed of 25 mph – Pg. 3-2	25-mph
Lighting	Must be complete and continuous - Pgs. 70-71	Should - Chp. 11	Adequate
CCTV	Must - Pg. 69	Should, as desired - Pg. 10-7	Non-compliant
Generator & UPS	Should - Pg. 64-67	Shall - Pg. 10-18	Present
ID Automation	Consider future needs - Pgs. 23-24	Consider future needs - Chp. 9	Not applicable
Func. Requirements	Should meet UFC - Pg. 10	Should, same as UFC - Pg. 1-10	Partially compliant

7.1.2.1. General Observations

In the short-term, it would not be feasible to incorporate needed enhancements required to meet UFC functional requirements (including rejection capabilities before and after the ID check), and adequate response zone treatments. However, minor enhancements can be made to enhance the overall security, safety and traffic flow while long-term needs are programmed. The following specific deficiencies were noted during field evaluations beyond the compliance summaries. Corrective actions are provided as applicable.

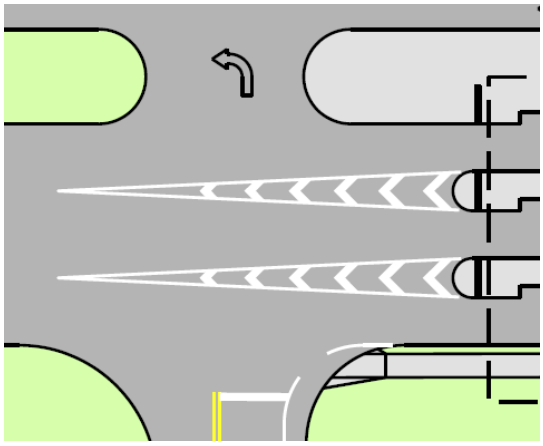
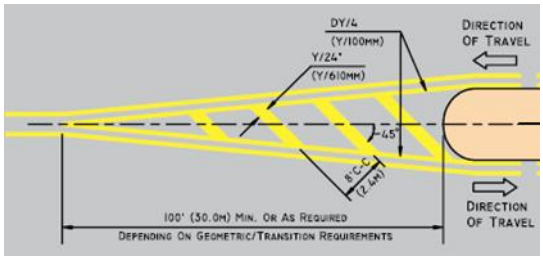
Photo	Deficiency/Corrective Action
	Deficiencies: The obstruction markings between the inbound and outbound lanes are not compliant and are the improper color. **Corrective Actions**: Install white obstruction markings at the nose of the median in the approach and response zones between the 2 inbound lanes and between the 2 outbound lanes in accordance to Section 6 of the SDDCTEA Pamphlet 55-15 as shown in the top photo. The obstruction markings separating the inbound lanes from the outbound lanes should be hatched as show in the bottom photo.  

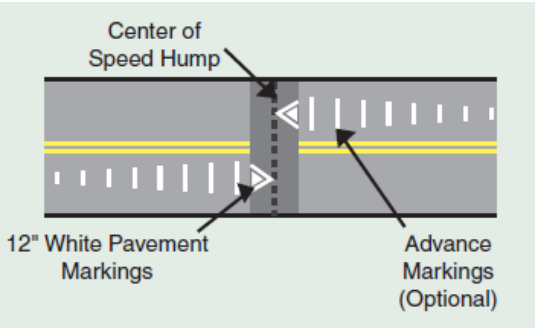
Photo	Deficiency/Corrective Action
	Deficiencies: Several of the barrels used in the approach zone to create a chicane and the barrels are not retroreflective. **Corrective Actions**: It is recommended to remove the barrels. If the barrels are desired to remain, upgrade all barrel delineation to allow for full visibility of the barrels during nighttime hours. If the intent of the barrels is to slow non-threat vehicles down, replace the barrels with speed humps and proper signage. 
	Deficiencies: The YIELD sign used between the two outbound lanes is mounted on a temporary post and it is confusing to which lane has the right-of-way. **Corrective Actions:** Remove the sign and install a YIELD sign on the far right-hand side of the roadway at the merging point of the two-outbound lanes. This will allow the inside outbound lane to have the right-of-way. The YIELD sign should be mounted on a permanent breakaway post.

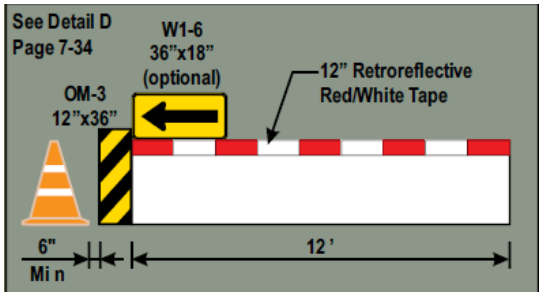
Photo	Deficiency/Corrective Action
	Deficiencies: The plastic barriers used in the approach zone are not properly delineated. **Corrective Actions:** Reevaluate the need for plastic barriers in the approach zone. If the barriers do remain, signs and delineation should be installed per SDDCTEA Pamphlet 55-15, Exhibit 7.13. 

Photo	Deficiency/Corrective Action
	Deficiencies: A STOP sign is used at the ID check which conflicts with the guard. **Corrective Actions:** SDDCTEA does not recommend or encourage the use of STOP signs at ID check islands. If the STOP sign is desired to stay, a 30”x30” STOP sign should be installed with a supplemental plaque stating PROCEED ONLY WHEN DIRECTED BY GUARD. Both signs should use type III sheeting or better and be mounted on a breakaway post.
	Deficiencies: The POST SPEED LIMIT sign is faded and has poor sheeting. **Corrective Actions:** Install a new POST SPEED LIMIT sign that uses Type III sheeting or better.

Photo	Deficiency/Corrective Action
	Deficiencies: Pavement markings are faded throughout the gate area. **Corrective Actions:** Restripe the faded pavement markings.
	Deficiencies: Signs throughout the response zone are mounted on fixed posts. **Corrective Actions:** Replace all fixed posts with breakaway posts which lessen the impact to vehicle if struck.

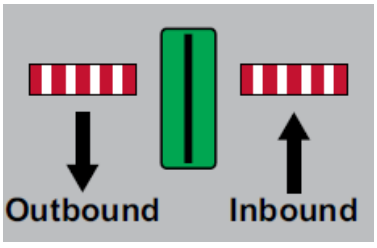
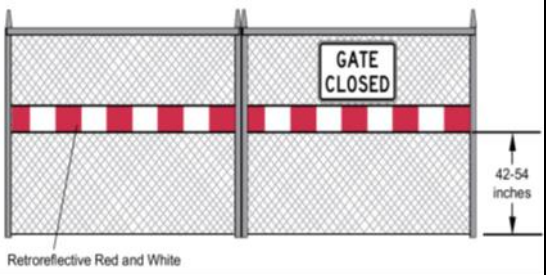
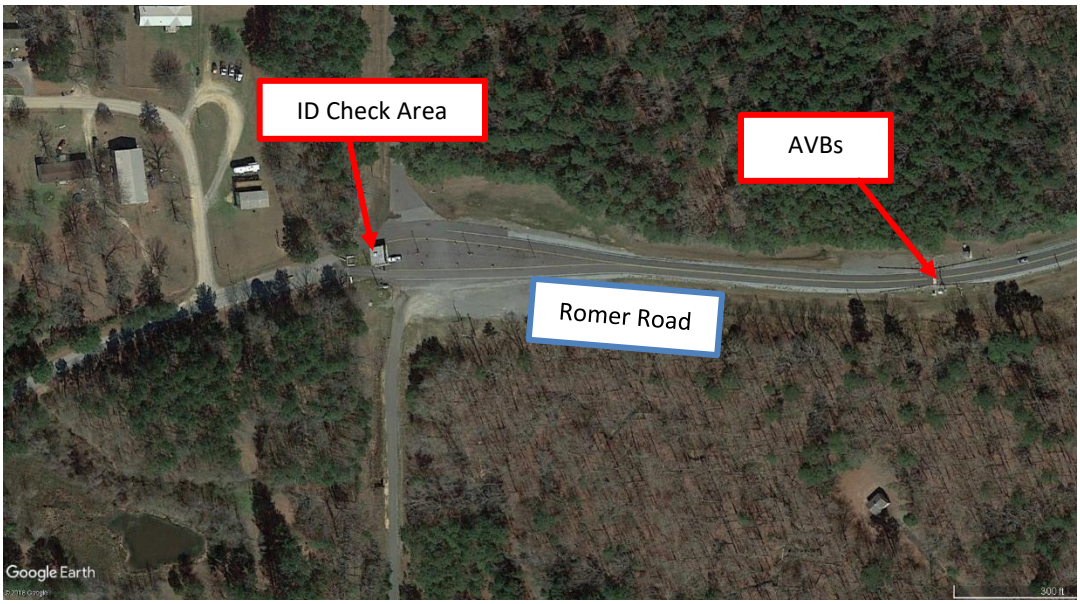
Photo	Deficiency/Corrective Action
 	Deficiencies: The swing gate at the first internal intersection remains open which creates a non-contiguous perimeter. Non-contiguous passive barrier is also used in the response zone. **Corrective Actions:** Close the gate and upgrade passive barrier to create a contiguous perimeter. Refer to UFC 4-022-01 for additional details relating to compliant passive barrier.
	Deficiencies: The AVBs are not properly delineated. **Corrective Actions:** Replace the old markings with alternating red and white stripes that are aligned vertically in the direction of travel. 

Photo	Deficiency/Corrective Action
	Deficiencies: The GATE EXIT SPEED sign is non-compliant. **Corrective Actions:** Install a CHECKPOINT (W3-10A-TEA) sign supplemented by an AHEAD plaque (W16-9P). W3-10a-TEA with W16-9P
	Deficiencies: No gate closure signage is used. **Corrective Actions:** Install gate closure signage and horizontal panels with retroreflective, alternating, vertical red/white stripes as shown below. 

7.1.3. Stark Gate

The Stark Gate is located on Romer Road. Exhibit 7.3 gives an overview of the gate area.

Exhibit 7.3 Stark Gate Overview



Usage	▪ POV Traffic
Hours of Operation	▪ 0600-1900 Monday-Friday
Number of ID check lanes	▪ One
Number of outbound lanes	▪ One
Inspection area	▪ None
Manpower during morning peak	▪ Two
Active vehicle barriers	▪ Yes
Existing inbound peak hour volume	▪ Tuesday – 127 ▪ Wednesday – 127
Processing Method	▪ Manual Processing

Approach Zone

Access Control Zone

Response Zone

Active Vehicle Barriers

Compliance Summary

Item	UFC 4-022-01 (July 2017)	SDDCTEA Pamphlet 55-15 (2014)	Existing Status
Approach Zone			
Travel Lanes	Per AASHTO/SDDCTEA Must be based on design vehicle - Pg. 29	12’ preferred (10’ min) - Pg. 3-10	1, compliant
Median	Per AASHTO/SDDCTEA - Pg. 29	Should - Pg. 3-16	Not applicable
Transitions	Per AASHTO/SDDCTEA - Pg. 29	Per AASHTO as shown - Pg. 3-27	Not applicable
Speed Management	Encouraged - Pg. 30	Build into design and consider others - Chp. 4	None
Signs & Markings	Per MUTCD and SDDCTEA - Pg. 29	Per MUTCD as shown - Chp. 7	Not compliant
Advance Turnaround	Must (Design for WB-67 truck for POV only ACP) - Pg. 27 and 32	Should per UFC - Pg. 1-14	None
Random Inspection	Should - Pg3. 46-47	Shall - Pg. 6-10	None
Access Control Zone			
ID Check Islands	Must provide min. for one guard and include protection; min. 3’ setback from curb - Pg. 56	10’ lanes and 10’ islands, Impact attenuator, Notched islands, Tandem capable – Section 6.4	Not compliant
Canopy	Should - Pgs. 63-64	Should - Pg. 6-14	Not present
Pedestrian Access	Consider - Pg. 31	Consider - Chp. 5	None
Post-ID Inspection	Must - Pgs. 11 and 46	Shall - Pg. 6-10	Not compliant
Post-ID Rejection	Must - Pg. 27	Should per UFC - Pg. 1-12	Not compliant
Chase Vehicle	Provide one space close to gatehouse - Pg. 58	Should - Pg. 6-4	None
Gatehouse	Every primary and secondary ACP must have - Pg. 57	Should - Pg. 6-4	Non-compliant

Item	UFC 4-022-01 (July 2017)	SDDCTEA Pamphlet 55-15 (2014)	Existing Status
Response Zone			
Travel Lanes	Per AASHTO/SDDCTEA Must be based on design vehicle - Pg. 29	12' preferred (10' min) - Pg. 3-10	1, compliant
Median	Per AASHTO/SDDCTEA - Pg. 29	Should - Pg. 3-16	Painted island used
Transitions	Per AASHTO/SDDCTEA - Pg. 29	Per AASHTO as shown - Pg. 3-27	Not applicable
Speed Management	Encouraged - Pg. 30	Build into design and consider others - Chp. 4	None
Adequate Length	Design for UFC threats and safety - Pg. 36	Shall per UFC and Army - Pg. 8-3	Not compliant
AVB Traffic Control	Must - Pg. 41	Shall - Pg. 8-7 to 8-28	Wedges
Overwatch Position	Must provide permanent or temporary - Pg. 62	Consider - Pg. 8-7	Present
Contiguous Perimeter	Must - Pg. 26	Shall - Pg. 8-4	Not compliant
Other			
Visitor Control	Based on installation requirements - Pgs. 52-53	One per installation per UFC - Chp. 1	None
Truck Inspection	One per installation and segregated from POVs - Pg. 10	One per installation per UFC - Chp. 1	Trucks don't use this gate
Speed Limit & Design Speed	Per MUTCD - Pg. 30	Speed Limit of 25 mph - Pg. 7-10 Design Speed of 25 mph – Pg. 3-2	25-mph
Lighting	Must be complete and continuous - Pgs. 70-71	Should - Chp. 11	Minimal
CCTV	Must - Pg. 69	Should, as desired - Pg. 10-7	Non-compliant
Generator & UPS	Should - Pg. 64-67	Shall - Pg. 10-18	Present
ID Automation	Consider future needs - Pgs. 23-24	Consider future needs - Chp. 9	Not applicable
Func. Requirements	Should meet UFC - Pg. 10	Should, same as UFC - Pg. 1-10	Partially compliant

7.1.3.1. General Observations

In the short-term, it would not be feasible to incorporate needed enhancements required to meet UFC functional requirements (including rejection capabilities before and after the ID check), and adequate response zone treatments. However, minor enhancements can be made to enhance the overall security, safety and traffic flow while long-term needs are programmed. The following specific deficiencies were noted during field evaluations beyond the compliance summaries. Corrective actions are provided as applicable.

Photo	Deficiency/Corrective Action
	Deficiencies: A non-compliant STOP AHEAD sign is used in the approach zone. The STOP AHEAD sign conveys the wrong message to drivers since they are approaching an ID checkpoint. **Corrective Actions:** Install a CHECKPOINT (W3-10A-TEA) sign supplemented by an AHEAD plaque (W16-9P). W3-10a-TEA with W16-9P

Photo	Deficiency/Corrective Action
	Deficiencies: Several barriers are used in the approach zone and at the ID check area. They are fixed object hazards and are not properly delineated. **Corrective Actions:** Remove the barriers. If they must remain, properly delineate the barriers in accordance with SDDCTEA Pamphlet 55-15.
	Deficiencies: Several of the barrels used in the approach and response zones are not retroreflective. **Corrective Actions**: Upgrade all barrel delineation to allow for full visibility of the barrels during nighttime hours.

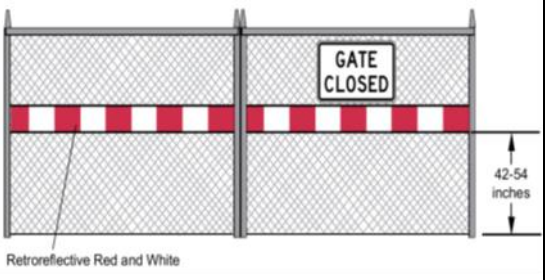
Photo	Deficiency/Corrective Action
	Deficiencies: No gate closure signage is used. **Corrective Actions:** Install gate closure signage and horizontal panels with retroreflective, alternating, vertical red/white stripes as shown below. 

Photo	Deficiency/Corrective Action
	Deficiencies: A STOP sign is used at the ID check which conflicts with the guard. **Corrective Actions:** SDDCTEA does not recommend or encourage the use of STOP signs at ID check islands. If the STOP sign is desired to stay, a 30”x30” STOP sign should be installed with a supplemental plaque stating PROCEED ONLY WHEN DIRECTED BY GUARD. Both signs should use type III sheeting or better and be mounted on a breakaway post.
	Deficiencies: The median painted island is not hatched. **Corrective Actions:** Hatch the median island such that vehicles are directed back into their desired travel lane.

Photo	Deficiency/Corrective Action
 	Deficiencies: There are two side roads immediately following the ID check area. This creates a non-contiguous perimeter since there are no AVBs or passive barrier to stop a threat vehicle. Vehicles can proceed into the base through these two side roads. **Corrective Actions:** It is recommended to gate off these side roads or realign them so that they can be accessed after the AVBs.
	Deficiencies: A bollard is in the clear zone of the outbound lane and is a roadside hazard. **Corrective Actions:** Remove the bollard.

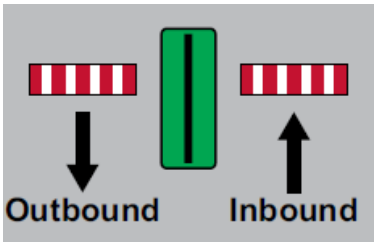
Photo	Deficiency/Corrective Action
	Deficiencies: The GATE EXIT SPEED sign is not compliant. **Corrective Actions:** Install a CHECKPOINT (W3-10A-TEA) sign supplemented by an AHEAD plaque (W16-9P). W3-10a-TEA with W16-9P
	Deficiencies: The AVBs are not properly delineated. **Corrective Actions:** Replace the old markings with alternating red and white stripes that are aligned vertically in the direction of travel. 

Photo	Deficiency/Corrective Action
	Deficiencies: There is no stop line to supplement the STOP HERE ON RED sign. **Corrective Actions:** Install a stop line adjacent to the STOP HERE ON RED sign for both the inbound and outbound lane.
	Deficiencies: The 35-mph speed limit sign is too small and is not retroreflective. **Corrective Actions:** Replace the speed limit sign with a 24”x30” sign that uses Type III sheeting or better.
	Deficiencies: No centerline markings are used in the approach zone. **Corrective Actions:** Stripe a double-yellow centerline.

7.2. Lane Requirements

To accurately size an ACP, a lane-processing rate must be established. SDDCTEA has performed numerous ACP security, safety and capacity traffic engineering assessments. During these assessments, SDDCTEA has collected significant data, which has been used to establish criteria regarding capacity and processing rates at ACPs. These rates are variable and are noted in exhibit 7.4.

Exhibit 7.4 Typical Processing Rates at Access Control Points

PROCESSING TECHNIQUE	MANUAL CHECKS		CHECKS USING HANDHELD DEVICES		AUTOMATED LANES	
	SINGLE LANE CHECKS	TANDEM LANE CHECKS	SINGLE LANE CHECKS	TANDEM LANE CHECKS	WITHOUT TRAFFIC ARMS	WITH TRAFFIC ARMS (UP/DOWN FOR EACH VEHICLE)
	vphpl	vphpl	vphpl	vphpl	vphpl	vphpl
Vehicle identification only	800 to 1,400	NA	NA	NA	800 to 1,400	550 to 800
Vehicle and occupant identification[4]	300 to 450	400 to 600	275 to 375	350 to 475	400 to 450	325 to 350
Inspection of mission essential vehicles only	20 to 120	NA	20 to 120	NA	NA	NA

Design Conditions

Vphpl – vehicles per hour per lane

Several factors will influence actual rates including:

- ACP layout and design – ACPs with proper (MUTCD/SDDCTEA) signs and markings will be more efficient since there will be less driver confusion.
- Vehicle characteristics – ACPs with higher amounts of visitors typically have slower processing rates.
- Security considerations – Contract guards are typically less efficient in processing.
- ID check operations – The use of traffic arms for each transaction will affect throughput efficiency.
- Political and command pressures – Command and local political pressures may require that traffic be processed more quickly even if security requirements are relaxed.

Refer to SDDCTEA Pamphlet 55-15 for more guidance on ACP processing influence factors.

7.3. Commercial Vehicle Holding Requirements

A commercial vehicle inspection area is used to inspect and process commercial vehicles that intend to access the installation. At ACPs where commercial and contractor vehicles are processed along with installation personnel, a reduction in capacity may be experienced because of the additional time required to process commercial vehicles and the lack of holding area. The commercial vehicle inspection area is currently located at the Dexter Gate.

To calculate the commercial vehicle capacity, the volume and classification data obtained from the traffic counters were used. Assuming an average processing rate of 6 minutes per vehicle (10 trucks per hour) per lane, the number of trucks not processed can be calculated for each hour of the day to determine if holding spaces are necessary.

The total hourly demand is calculated by adding the number of unprocessed trucks from the previous hour to the arrival volume of the current hour. The number of unprocessed trucks (holding requirement) is then the difference between the total hourly demand volume and the number of trucks processed; if the number of trucks processed exceeds the total hourly demand, the number of unprocessed trucks is zero. Exhibit 7.5 summarizes the calculations used to determine the number of trucks not processed, i.e., the truck holding requirement.

Exhibit 7.5 Unprocessed Vehicles Calculation Summary

Time Period	Arriving Vehicles	Remaining Demand (Not Inspected from Previous Hour)	Total Hourly Demand	Processing Rate (veh/hr)	Vehicles Not Inspected (Holding Requirement)
0500-0600	3	0	3	10	0
0600-0700	1	0	1	10	0
0700-0800	1	0	1	10	0
0800-0900	4	0	4	10	0
0900-1000	4	0	4	10	0
1000-1100	4	0	4	10	0
1100-1200	3	0	3	10	0
1200-1300	2	0	2	10	0
1300-1400	5	0	5	10	0
1400-1500	3	0	3	10	0
1500-1600	1	0	1	10	0
1600-1700	1	0	1	10	0

The results indicate that no holding spaces are necessary in the approach zone. Thus, no recommendations are provided.

7.4. Lane Calculations

7.4.1. ACP/ECF SMART Decision Evaluator

The lane requirements at each ACP are determined in accordance with SDDCTEA and utilized rates contained in SDDCTEA Pamphlet 55-15. The primary tool for calculating lane requirements is the *ACP/ECF SMART Decision Evaluator*. The *SMART Decision Evaluator*:

- Provides comprehensive perspective
- Provides awareness of ramifications
- Is derived from common engineering, security and economic principals
- Narrows the picture from “10,000 feet” to “1,000 feet”

Even though the evaluator provides the total cost of manpower, infrastructure, automation, traffic delay and an estimated risk score, it does not eliminate the need for practical knowledge or detailed engineering assessments.

SDDCTEA believes it is prudent to consider this processing scenario for future lane requirements; however, SDDCTEA also suggests that other processing scenarios (manual single, manual tandem, handheld manual, handheld tandem, AIE without arms) be evaluated to provide perspective on the security, manpower, automation, and traffic issues associated with each scenario so that when combined with practical knowledge, decisions are made with full awareness of the ramifications. The *ACP/ECF SMART Decision Evaluator* does this by considering life cycle infrastructure, manpower and automation costs as well as considering the traffic impacts of implementing specific processing scenarios.

In general, lane requirements for manual single processing, AIE processing and handheld single processing will be similar; however, in some cases they may vary due to slight deviations in processing rates. In most cases single processing (manual, handheld, automated) offers the most efficient use of manpower versus tandem (manual and handheld) processing and in many cases total lifecycle costs of single processing is less than tandem processing despite higher infrastructure costs (more lanes) required for single processing. Actual construction estimates and costs may vary from the *ACP/ECF SMART Decision Evaluator* as construction estimates are based on per lane costs and actual costs may vary greatly based on site conditions and functionality of the existing ACP.

7.5. Existing and Future ACP Recommendations

Currently the installation has three operational ACPs. The installation has also developed an Area Development Plan which has the commercial vehicle inspection area to be relocated to the Plainview Gate which is important due to this area being considered a site for the Joint Chemical Biological Defense Logistics Center. The installation also mentioned the possibility of consolidating gates to reduce the required manpower needed. Therefore, the study team will provide recommendations with required lane calculations and manpower for these multiple scenarios.

Scenario 1:
The first scenario is an existing scenario where all three gates remain open but the commercial vehicle inspection area is relocated to the Plainview Gate. The following table summarizes the existing ID check lanes, the existing demand volume, and the required number of ID check lanes for the various types of processing.

Exhibit 7.6 Lane Calculation Summary – Scenario 1

ACP	Existing ID Check Lanes	Existing Demand Volume	Required ID Check Lanes					
			Single Manual Processing	Tandem Manual Processing	Single Handheld Processing	Tandem Handheld Processing	AIE Processing (No Arms)	AIE Processing (With Arms)
Plainview Gate	1	252	1	1	1	1	1	1
Dexter Gate	2	200	1	1	1	1	1	1
Stark Gate	1	184	1	1	1	1	1	1

The results indicate that a sufficient number of lanes are used at each gate to meet the existing demand under existing scenarios.

Scenario 2:

The second scenario includes the relocation of the commercial vehicles inspection area with the closure of the Stark Gate to help reduce the required manpower. The following table summarizes the existing ID check lanes, the existing demand volume, and the required number of ID check lanes for the various types of processing. It should be noted that the existing demand from the Stark Gate was applied to the Dexter Gate since this is the most logical alternative ACP for personnel who currently use the Stark Gate.

Exhibit 7.7 Lane Calculation Summary - Scenario 2

ACP	Existing ID Check Lanes	Existing Demand Volume	Required ID Check Lanes					
			Single Manual Processing	Tandem Manual Processing	Single Handheld Processing	Tandem Handheld Processing	AIE Processing (No Arms)	AIE Processing (With Arms)
Plainview Gate	1	252	1	1	1	1	1	1
Dexter Gate	2	384	2	1	2	1	1	2

The results indicate that two ID checks are required at Dexter Gate if single handheld processing is used. This indicates that both gates will operate adequately for the existing demand if the Stark Gate would be closed.

Scenario 3:

The third scenario includes consolidating the ACPs into one location where both POVs and commercial vehicles will enter the installation from. The existing demand from all three gates was added up and applied to a combined gate scenario. The results are shown below.

Exhibit 7.8 Lane Calculation Summary - Scenario 3

ACP	Existing ID Check Lanes	Existing Demand Volume	Required ID Check Lanes					
			Single Manual Processing	Tandem Manual Processing	Single Handheld Processing	Tandem Handheld Processing	AIE Processing (No Arms)	AIE Processing (With Arms)
Combined Gate	NA	636	2	2	2	2	2	2

If a combined gate concept would be used, two ID check lanes are recommended with a separate commercial vehicle inspection lane.

Exhibit 7.9 shows manpower requirements for the required number of lanes for each scenario. Note that the personnel numbers do not consider inspection staff, pedestrian processing staff, or staff inside the gatehouse.

Exhibit 7.9 Manpower Summary

Scenario	Required Manpower
Scenario 1	4
Scenario 2	4
Scenario 3	3

7.6. Interim-term Gate Concepts

This section identifies an interim-term improvement option developed by the study team for the Dexter Gate and Stark Gate. No concept will be provided for the Plainview Gate since the USACE will be performing this design.

7.6.1. Dexter Gate Interim-term Concept

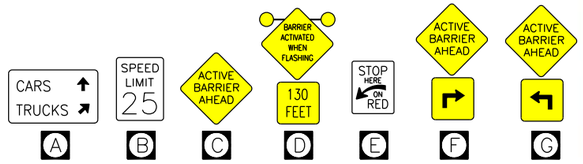
An interim-term gate was designed for the Dexter Gate that would use as much of the existing footprint as possible. The design of the recommended ECF contains the following features:

- Existing 2 ID check lanes for POV and commercial traffic
- Canopy that extends over the right ID check lane
- Pre-ID check turnaround designed for WB-67 trucks
- Post-ID check rejection designed for WB-67 trucks
- Sliding gates used over railroad tracks to allow train access
- Existing overwatch to remain
    - Additional overwatch parking space added
- AVB's located at the proper location to contain threat scenarios
    - Utilizes conventional signs and signals AVB Safety System with advance speed detection and wrong-way detection for the outbound lanes

In addition to the features listed above, passive barrier was installed throughout the access control and response zone to create a secured perimeter. Two additional AVBs will need to be installed on the northern intersection leg to create a contiguous perimeter as shown in exhibit 7.10.

NOTES:

1. CONCEPTUAL DESIGN SHOWN DEVELOPED PER THE AASHTO POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS, 2011. DETAILED DESIGN REQUIRED IN ACCORDANCE WITH AASHTO AND LOCAL/STATE DOT GUIDELINES.
2. SCALE SHOWN IS APPROXIMATE AND BASED ON AVAILABLE MAPPING. SURVEY REQUIRED PRIOR TO ANY DETAILED DESIGN.
3. INSTALLATION DID NOT DISCLOSE ENVIRONMENTAL CONCERNS FOR THE CONCEPTUAL DESIGN, ALTHOUGH THERE MAY BE POTENTIAL FOR ENVIRONMENTAL IMPACTS. FURTHER DEVELOPMENT OF THIS DESIGN SHOULD INCLUDE AN ENVIRONMENTAL ASSESSMENT.
4. CONCEPTUAL DESIGN IS FEASIBLE BASED ON INFORMATION PROVIDED BY INSTALLATION PLANNING/ENGINEERING.



ACTIVE VEHICLE BARRIER OPERATING WITH CONVENTIONAL TRAFFIC AND SAFETY CONTROL SYSTEM WITH ADVANCE SPEED AND WRONG WAY DETECTIONS PER SDDCTEA PAMPHLET 55–15 (TYP)

EXISTING ACTIVE VEHICLE BARRIER OPERATING WITH CONVENTIONAL TRAFFIC AND SAFETY CONTROL SYSTEM WITH ADVANCE SPEED AND WRONG WAY DETECTIONS PER SDDCTEA PAMPHLET 55–15 (TYP)

EXISTING OVERWATCH TO REMAIN

OVERWATCH PARKING SPOT

PASSIVE BARRIER (TYP)

GATE

EXISTING CANOPY

BACK–UP GENERATOR

PROPOSED TRUCK LANE CANOPY

0 50' 100'
1" = 100'

Gannett Fleming

EXHIBIT 7.10

DEXTER GATE INTERIM–TERM CONCEPTUAL DESIGN

PINE BLUFF ARSENAL, ARKANSAS

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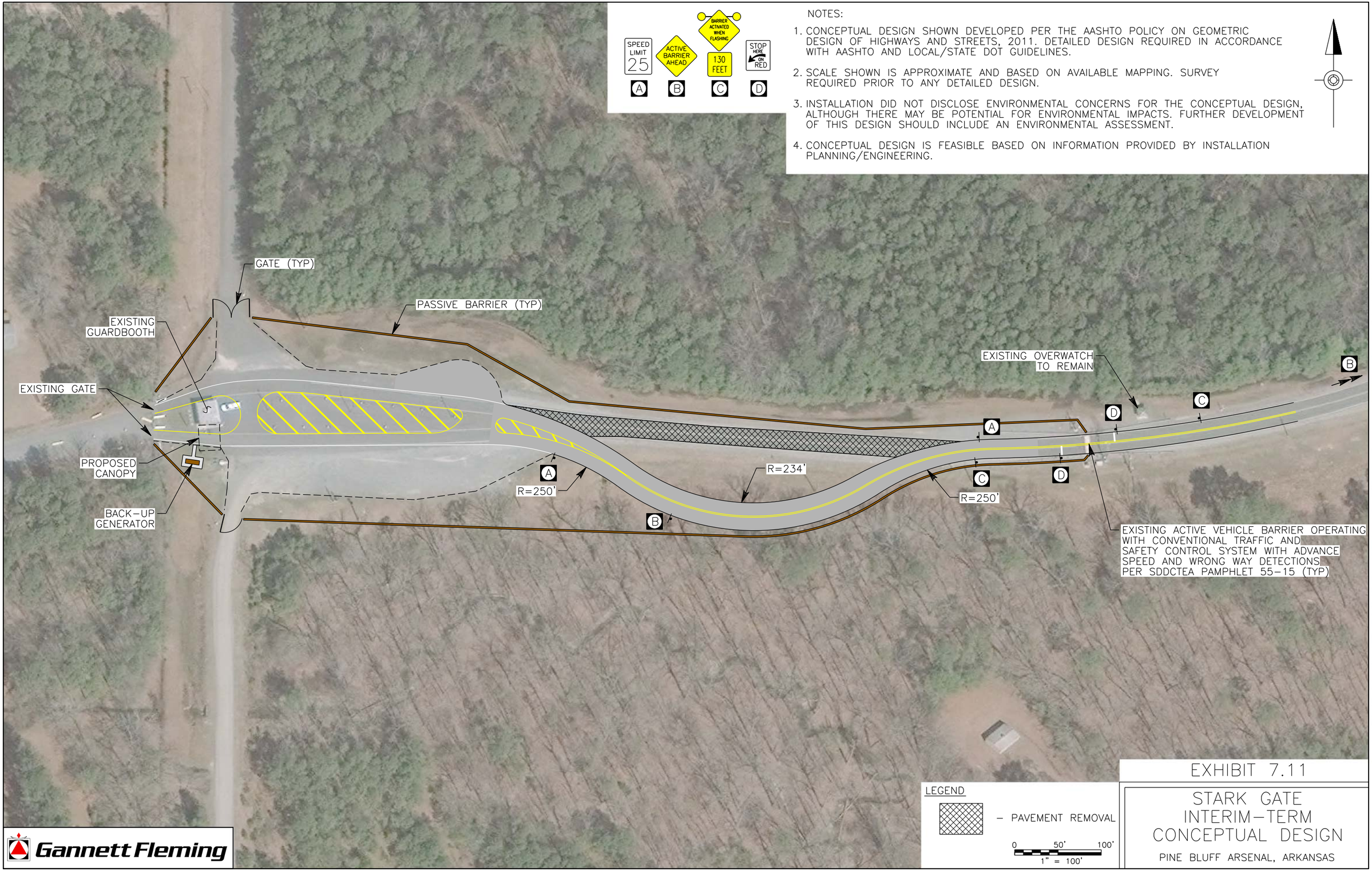
7.6.2. Stark Gate Interim-term Concept

An interim-term gate was designed for the Stark Gate that would use as much of the existing footprint as possible. The design of the recommended ECF contains the following features:

- Existing ID check lane for POV traffic
- Canopy that extends over the ID check lane
- Post-ID check rejection designed for WB-67 trucks
- Existing overwatch to remain
- AVB's located at the proper location to contain threat scenarios
    - Utilizes conventional signs and signals AVB Safety System with advance speed detection and wrong-way detection for the outbound lanes

In addition to the features listed above, passive barrier was installed throughout the access control and response zone to create a secured and contiguous perimeter. Two swing gates were also installed for the two access roads located immediately after the ID check lane. The concept can be seen in exhibit 7.11.



NOTES:

1. CONCEPTUAL DESIGN SHOWN DEVELOPED PER THE AASHTO POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS, 2011. DETAILED DESIGN REQUIRED IN ACCORDANCE WITH AASHTO AND LOCAL/STATE DOT GUIDELINES.
2. SCALE SHOWN IS APPROXIMATE AND BASED ON AVAILABLE MAPPING. SURVEY REQUIRED PRIOR TO ANY DETAILED DESIGN.
3. INSTALLATION DID NOT DISCLOSE ENVIRONMENTAL CONCERNS FOR THE CONCEPTUAL DESIGN, ALTHOUGH THERE MAY BE POTENTIAL FOR ENVIRONMENTAL IMPACTS. FURTHER DEVELOPMENT OF THIS DESIGN SHOULD INCLUDE AN ENVIRONMENTAL ASSESSMENT.
4. CONCEPTUAL DESIGN IS FEASIBLE BASED ON INFORMATION PROVIDED BY INSTALLATION PLANNING/ENGINEERING.

LEGEND

– PAVEMENT REMOVAL

0 50' 100'
1" = 100'

EXHIBIT 7.11

STARK GATE INTERIM-TERM CONCEPTUAL DESIGN

PINE BLUFF ARSENAL, ARKANSAS

Gannett Fleming

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8. SUMMARY OF IMPROVEMENT OPTIONS

The purpose of this study was to provide short-term improvement options to address existing safety-related deficiencies and interim-term/long-term improvement conceptual designs to address future traffic patterns.

The following tables show improvement options in the order they were presented in the report. Costs vary from minimal to millions of dollars. Some improvements can be accomplished through existing maintenance programs or as part of other improvements, while improvements that are more extensive may require dedicated programming and funding. Costs shown are in 2018 dollars.

8.1. Short-term Recommendations

Location	Improvement	Report Section	Estimated Cost (2018 Dollars)
Common Deficiencies	▪ Replace all fixed posts with posts that utilize a breakaway design ▪ Replace all signs with Type I sheeting or any signs with poor retroreflectivity with signs that use type III sheeting or better	6.1	Fixed posts: $110/post Type III sheeting: $22/SF
Hoadley Road and Dollarway Road (Plainview Gate External)	▪ Mount the YIELD and DO NOT ENTER signs on their own separate breakaway posts ▪ Replace the KEEP RIGHT sign at the westbound approach with a R4-7 sign for consistency ▪ Mount each KEEP RIGHT sign on their own breakaway posts and them on the nose of the median in the direction in which vehicles are traveling ▪ Remove the curb cuts on the southern leg ▪ Install a concrete channelizing island at the northwest corner of the intersection. Stripe the area around the channelizing islands. ▪ Remove the YIELD sign on the eastbound approach ▪ Install lane use control signage on the signal mast arms and in advance of the intersection for the northbound and southbound approaches ▪ Restripe the faded pavement markings throughout the intersection ▪ Stripe a stop bar for each approach lane ▪ Slightly modify the turn radii and remove the median islands at the eastbound and westbound approaches	6.2.1	Signing Improvements: $5,000 Pavement marking upgrades: $8,500 Remove curb cuts: $700 Modify the turn radii: $66,000 Install concrete island: $1,800
Hoadley Road and Sibert Road (Plainview Gate Internal)	▪ Relocate the WELCOME sign that supplements the eastbound approach stop sign ▪ Replace the TRUCK ROUTE sign with a new Type III sheeting TRUCK ROUTE sign that is 24”x18” and is mounted to a height of 5 feet ▪ Replace the wayfinding sign with multiple wayfinding signs that have a maximum of three destinations and are up to date ▪ Restripe the broken and faded arrow marking ▪ Slightly modify the turn radii to accommodate commercial vehicles	6.2.2	Signing Improvements: $2,900 Pavement marking upgrades: $400 Modify the turn radii: $50,000

Location	Improvement	Report Section	Estimated Cost (2018 Dollars)
Wise Road and Dollarway Road (Dexter Gate External)	▪ Backfill the shoulder area at the northbound approach ▪ Remove the stop sign on the left-hand side of the roadway at the westbound approach ▪ Modify the turn radii to accommodate commercial vehicles ▪ Install compliant lane use arrow markings and a stop line at the westbound approach	6.2.3	Signing Improvements: $1,300 Pavement marking upgrades: $800 Backfill the shoulder: $500 Modify the turn radii: $22,000
Wise Road and Atkisson Road (Dexter Gate Internal)	▪ Delineate the swing gate with retroreflective, alternating, vertical red/white stripes and delineate the post since it is within the clear zone ▪ Install a ROAD CLOSED sign mounted on the swing gate ▪ Backfill the shoulder area for vehicles making a right turn from Atkisson Road ▪ Modify the turn radii to accommodate commercial vehicles	6.2.4	Signing Improvements: $1,900 Backfill the shoulder: $1,500 Modify the turn radii: $40,000
Stark Gate Road and Dollarway Road (Stark Gate External)	▪ Remove the old post that contains no signing ▪ Backfill the shoulder to create a smooth transition from the shoulder to the driveway ▪ Stripe a double-yellow centerline	6.2.5	Signing Improvements: $100 Pavement marking upgrades: $800 Backfill the shoulder: $100
Romer Road and Hanlon Road (Stark Gate Internal)	▪ Replace the stop sign with one that uses Type III sheeting or better and is mounted to a height of at least 5 feet ▪ Optional - Relocate the light pole (optional) ▪ Install an OM3-R object marker	6.2.6	Signing Improvements: $500 Relocate the light pole: $5,000 (optional)

Location	Improvement	Report Section	Estimated Cost (2018 Dollars)
Plainview Gate	▪ Install a CHECKPOINT sign supplemented by an AHEAD plaque in the approach zone ▪ Replace the Visitor's sign with a new Visitor's sign that uses white lettering on a green or brown background ▪ If the barriers do remain, signs and delineation should be installed per SDDCTEA Pamphlet 55-15, Exhibit 7.13 ▪ Optional - Remove the Czech hedgehogs and planters and to ensure that the fencing and swing gates are reinforced ▪ Refer to SDDCTEA Pamphlet 55-15 Chapter 7 for details on compliant chicanes ▪ Remove the traffic cones (optional) ▪ If the cones must remain, utilize compliant traffic cones according to MUTCD standards ▪ Install gate closure signage ▪ Install a supplemental PROCEED ONLY WHEN DIRECTED BY GUARD plaque for the STOP sign ▪ Replace all fixed posts with breakaway posts ▪ In accordance with the DoD Anti-Ram Vehicle Barrier List, boulders are not an approved type of passive barrier. Natural barriers such as boulders are not recommended since they must be specially designed and approved to stop a threat vehicle. Install an acceptable type of passive barrier from the DoD Anti-Ram Vehicle Barrier List. ▪ Install a new POST SPEED LIMIT sign that uses Type III sheeting or better ▪ Install a CHECKPOINT sign supplemented by an AHEAD plaque ▪ Remove the two arrow signs that are turned away from the road since they are not needed ▪ Properly restripe the AVBs ▪ Remove the stoppers in front of the BARRIER sign and delineate the sign with an OM3-R object marker ▪ Restripe the faded pavement markings in the response zone	7.1.1	Signing Improvements: $7,800 Pavement marking upgrades: $600 Remove the hedgehogs, planters, and traffic cones (optional): $1,200 Delineate the AVBs: $400 Remove the stoppers: $100

Location	Improvement	Report Section	Estimated Cost (2018 Dollars)
Dexter Gate	▪ Install white obstruction markings at the nose of the median in the approach and response zones between the 2 inbound lanes and between the 2 outbound lanes in accordance to Section 6 of the SDDCTEA Pamphlet 55-15 ▪ Optional - It is recommended to remove the barrels in the approach zone ▪ If the barrels are desired to remain, upgrade all barrel delineation to allow for full visibility of the barrels during nighttime hours ▪ Optional - If the intent of the barrels is to slow non-threat vehicles down, replace the barrels with speed humps and proper signage. ▪ Remove the YIELD sign between the two outbound lanes and install a YIELD sign on the far right-hand side of the roadway at the merging point of the two-outbound lanes ▪ If the barriers in the approach zone remain, install sigs and delineation per SDDCTEA Pamphlet 55-15 ▪ If a STOP sign is desired to remain at the ID check, install a supplemental PROCEED ONLY WHEN DIRECTED BY GUARD plaque ▪ Install a new POST SPEED LIMIT sign that uses Type III sheeting or better ▪ Restripe the faded pavement markings throughout the gate area ▪ Replace all fixed posts in the response zone with breakaway posts ▪ Close the gate at the first internal intersection and upgrade passive barrier to create a contiguous perimeter ▪ Properly restripe the AVBs ▪ Install a CHECKPOINT sign supplemented by an AHEAD plaque ▪ Install gate closure signage	7.1.2	Signing Improvements: $9,700 Pavement marking upgrades: $6,300 Install speed humps (optional): $10,000 Remove the barrels (optional): $750 Restripe the AVBs: $400 Passive barrier: Included in long-term costs

Location	Improvement	Report Section	Estimated Cost (2018 Dollars)
Stark Gate	▪ Install a CHECKPOINT sign supplemented by an AHEAD plaque in the approach zone ▪ Optional - It is recommended to remove the barrels in the approach zone ▪ If the barrels are desired to remain, upgrade all barrel delineation to allow for full visibility of the barrels during nighttime hours ▪ Install gate closure signage ▪ If a STOP sign is desired to remain at the ID check, a 30”x30” STOP sign should be installed with a supplemental plaque stating PROCEED ONLY WHEN DIRECTED BY GUARD ▪ Hatch the median island such that vehicles are directed back into their desired travel lane ▪ Gate off the two side roads immediately following the ID check area ▪ Remove the bollard in the outbound lane ▪ Install a CHECKPOINT sign supplemented by an AHEAD plaque in the outbound lane ▪ Properly restripe the AVBs ▪ Install a stop line adjacent to the STOP HERE ON RED sign for both the inbound and outbound lane ▪ Replace the speed limit sign with a 24”x30” sign that uses Type III sheeting or better ▪ Stripe a double-yellow centerline in the approach zone	7.1.3	Signing Improvements: $6,200 Pavement marking upgrades: $6,200 Remove the barrels (optional): $700 Remove bollard: $100 Restripe the AVBs: $400

8.2. Interim-term Recommendations

Location	Improvement	Report Section	Estimated Cost (2018 Dollars)

Dexter Gate	• Existing 2 ID check lanes for POV and commercial traffic
	• Canopy that extends over the right ID check lane
	• Pre-ID check turnaround designed for WB-67 trucks
	• Post-ID check rejection designed for WB-67 trucks
	• Sliding gates used over railroad tracks to allow train access
	• Existing overwatch to remain
	  ○ Additional overwatch parking space added
	• AVB's located at the proper location to contain threat scenarios
	  ○ Utilizes conventional signs and signals AVB Safety System with advance speed detection and wrong-way detection for the outbound lanes
	• Passive barrier installed to create a secured perimeter
		7.6.1	$1,000,000

Stark Gate	• Existing ID check lane for POV traffic • Canopy that extends over the ID check lane • Post-ID check rejection designed for WB-67 trucks • Existing overwatch to remain • AVB's located at the proper location to contain threat scenarios ○ Utilizes conventional signs and signals AVB Safety System with advance speed detection and wrong-way detection for the outbound lanes • Passive barrier installed to create a secured and contiguous perimeter	7.6.2	$1,300,000

APPENDIX A

TRAFFIC DATA

Time	Plainview Gate		1 - Hoadley		2 - Sibert		3 - Atkisson		Stark Gate		Dexter Gate	
	Inbound	Outbound	EB	WB	NB	SB	NB	SB	Inbound	Outbound	Inbound	Outbound
Counter Serial Number	721	2723	3004	5996	6002	3507	3841	4561	2722	3842	3840	4066
2/27/2018 0:00	0	0	0	0	1	0	0	0	0	0	1	0
2/27/2018 0:15	0	0	0	0	0	0	0	0	0	0	0	0
2/27/2018 0:30	0	0	0	0	0	0	0	1	0	0	0	0
2/27/2018 0:45	0	0	0	0	0	2	0	0	0	0	0	0
2/27/2018 1:00	0	0	0	0	0	0	0	0	0	0	0	0
2/27/2018 1:15	0	0	0	0	0	0	0	0	0	0	0	0
2/27/2018 1:30	0	0	0	0	0	1	0	0	0	0	0	1
2/27/2018 1:45	0	0	0	0	0	0	1	0	0	0	0	1
2/27/2018 2:00	0	0	0	0	0	0	0	0	0	0	0	0
2/27/2018 2:15	0	0	0	0	1	0	0	0	0	0	0	0
2/27/2018 2:30	0	0	0	0	0	0	0	0	0	0	0	0
2/27/2018 2:45	0	0	0	0	0	0	0	0	0	0	0	0
2/27/2018 3:00	0	0	0	0	0	0	0	0	0	0	0	0
2/27/2018 3:15	0	0	0	0	1	0	0	0	0	0	0	0
2/27/2018 3:30	0	0	0	0	0	0	0	0	0	0	0	0
2/27/2018 3:45	0	0	0	0	0	0	0	0	0	0	0	0
2/27/2018 4:00	0	1	1	2	1	1	0	0	0	0	0	0
2/27/2018 4:15	1	0	0	0	2	1	0	0	0	0	3	0
2/27/2018 4:30	1	1	1	0	1	2	0	0	0	0	3	0
2/27/2018 4:45	5	1	2	0	1	1	0	0	0	0	0	0
2/27/2018 5:00	7	3	6	1	1	1	0	1	0	1	6	0
2/27/2018 5:15	17	1	14	2	0	3	1	0	4	0	11	0
2/27/2018 5:30	19	2	8	0	6	1	3	0	9	1	7	4
2/27/2018 5:45	36	0	24	1	9	2	10	0	13	1	16	4
2/27/2018 6:00	50	7	34	1	17	10	14	1	18	1	30	2
2/27/2018 6:15	64	4	33	3	14	15	27	3	32	0	53	8
2/27/2018 6:30	34	3	13	4	15	8	21	1	41	1	21	1
2/27/2018 6:45	21	5	7	9	13	10	8	5	36	0	24	2
2/27/2018 7:00	33	2	10	7	18	7	11	1	14	0	13	1
2/27/2018 7:15	12	5	8	8	13	8	5	5	29	1	7	1
2/27/2018 7:30	20	4	6	11	21	10	11	13	25	1	7	4
2/27/2018 7:45	14	8	8	8	17	12	8	11	46	1	9	1
2/27/2018 8:00	12	7	9	3	16	9	9	2	14	1	3	6
2/27/2018 8:15	15	3	16	6	17	12	11	5	7	0	5	1
2/27/2018 8:30	10	3	16	1	9	7	9	6	1	0	5	2
2/27/2018 8:45	3	7	7	6	9	18	4	10	0	0	4	3
2/27/2018 9:00	7	5	11	3	9	10	10	7	0	0	2	3
2/27/2018 9:15	3	3	3	9	10	7	6	4	0	0	1	0
2/27/2018 9:30	7	6	6	12	12	9	8	6	0	0	4	2
2/27/2018 9:45	6	9	6	12	14	13	7	12	0	1	5	2
2/27/2018 10:00	3	8	7	4	6	17	5	11	0	0	2	5
2/27/2018 10:15	4	3	6	7	16	11	6	5	0	0	4	2
2/27/2018 10:30	4	4	8	7	10	7	10	4	0	0	3	9
2/27/2018 10:45	3	17	13	7	8	17	5	20	0	0	0	10
2/27/2018 11:00	7	49	3	23	9	14	6	20	1	3	4	20
2/27/2018 11:15	13	28	9	17	8	9	5	6	3	7	9	12
2/27/2018 11:30	20	14	11	6	5	10	15	0	2	8	13	7
2/27/2018 11:45	26	13	14	1	12	14	5	5	3	5	13	6
2/27/2018 12:00	26	13	11	15	20	12	16	5	4	3	8	3
2/27/2018 12:15	21	7	8	13	14	6	14	7	8	5	6	4
2/27/2018 12:30	20	7	9	5	23	12	5	8	3	4	5	4
2/27/2018 12:45	11	4	5	5	7	9	8	10	1	2	4	2
2/27/2018 13:00	8	10	12	8	10	13	10	6	2	0	7	2
2/27/2018 13:15	8	5	10	10	11	14	10	12	1	1	2	2
2/27/2018 13:30	3	7	4	7	1	8	5	10	0	0	8	9
2/27/2018 13:45	7	8	8	5	8	11	7	8	0	0	2	6
2/27/2018 14:00	3	9	7	6	3	12	8	7	0	0	3	5
2/27/2018 14:15	9	13	2	8	10	12	8	7	2	1	4	4
2/27/2018 14:30	9	8	6	7	12	10	8	7	1	2	2	2
2/27/2018 14:45	6	9	10	4	1	17	6	6	1	8	3	4
2/27/2018 15:00	4	10	8	6	1	11	7	5	0	11	2	2
2/27/2018 15:15	2	11	4	3	0	9	5	4	1	12	0	1
2/27/2018 15:30	5	7	6	5	0	13	5	14	1	50	0	8
2/27/2018 15:45	3	22	5	12	0	14	4	16	0	15	1	14
2/27/2018 16:00	6	42	14	6	13	26	5	17	2	35	5	42
2/27/2018 16:15	3	44	6	14	8	18	4	30	0	65	5	25
2/27/2018 16:30	6	45	2	25	7	13	1	13	0	42	3	27
2/27/2018 16:45	5	86	0	63	11	15	0	14	0	23	6	42
2/27/2018 17:00	10	41	1	17	8	14	1	5	1	9	2	17
2/27/2018 17:15	4	19	1	7	3	11	0	2	0	14	4	9
2/27/2018 17:30	1	13	1	2	2	6	0	0	0	1	1	4
2/27/2018 17:45	2	8	1	6	3	5	0	0	1	0	1	8
2/27/2018 18:00	1	5	0	0	2	6	0	0	0	0	5	11
2/27/2018 18:15	1	1	0	0	1	0	0	0	0	0	1	0
2/27/2018 18:30	1	1	0	1	1	0	0	0	0	0	0	3
2/27/2018 18:45	0	2	0	1	0	2	0	1	1	1	0	2
2/27/2018 19:00	3	2	0	1	4	3	0	0	0	0	0	3
2/27/2018 19:15	0	0	0	0	1	1	1	1	0	0	1	3
2/27/2018 19:30	0	0	0	0	1	0	0	0	0	1	0	1
2/27/2018 19:45	1	1	0	0	0	1	0	0	1	0	0	0
2/27/2018 20:00	0	0	0	0	0	0	0	0	0	0	0	0
2/27/2018 20:15	0	0	0	0	0	1	0	0	0	0	0	0
2/27/2018 20:30	0	0	0	0	1	1	0	1	0	0	1	0
2/27/2018 20:45	0	0	0	0	1	1	0	0	0	0	0	1
2/27/2018 21:00	0	0	0	1	1	0	0	0	0	0	1	0
2/27/2018 21:15	0	0	0	0	0	0	0	0	0	1	0	1
2/27/2018 21:30	0	0	0	0	0	0	0	0	2	2	0	0
2/27/2018 21:45	0	0	0	0	0	0	0	0	0	0	0	2
2/27/2018 22:00	0	1	0	0	0	0	0	0	0	0	0	0
2/27/2018 22:15	0	0	0	0	0	1	0	0	0	0	0	0
2/27/2018 22:30	1	0	0	0	1	0	0	0	1	0	0	0
2/27/2018 22:45	0	0	1	0	0	0	0	0	0	0	0	0
2/27/2018 23:00	1	1	0	1	0	0	0	0	0	0	0	0
2/27/2018 23:15	0	0	0	0	0	0	0	0	0	0	0	0
2/27/2018 23:30	0	0	0	0	0	0	1	0	0	0	0	0
2/27/2018 23:45	0	0	0	0	0	0	0	0	0	1	0	0
AM Peak Hour	184	24	104	35	71	47	72	31	127	4	128	18
Midday Peak Hour	93	108	45	53	69	50	50	46	18	23	43	49
PM Peak Hour	25	217	31	119	39	72	21	77	4	165	19	136
24-Hour Volume	668	688	462	445	512	587	380	381	332	342	381	393
Average Speed	25	29	41	38	44	42	44	41	37	36	31	29
85% Speed	29	34	47	45	51	48	52	48	43	41	38	34

Time	Plainview Gate		1 - Hoadley		2 - Sibert		3 - Atkisson		Stark Gate		Dexter Gate	
	Inbound	Outbound	EB	WB	NB	SB	NB	SB	Inbound	Outbound	Inbound	Outbound
Counter Serial Number	721	2723	3004	5996	6002	3507	3841	4561	2722	3842	3840	4066
2/28/2018 0:00	0	0	1	0	0	0	0	0	0	0	0	0
2/28/2018 0:15	0	0	0	0	0	0	0	0	0	0	0	0
2/28/2018 0:30	0	0	0	0	0	0	0	0	0	0	0	0
2/28/2018 0:45	0	1	0	0	0	0	0	0	0	0	0	0
2/28/2018 1:00	0	0	0	0	0	0	0	0	0	0	0	0
2/28/2018 1:15	0	0	0	0	0	0	0	0	0	0	0	0
2/28/2018 1:30	0	0	0	0	0	0	0	0	0	0	0	0
2/28/2018 1:45	0	0	0	0	0	0	0	0	0	0	0	0
2/28/2018 2:00	0	0	0	0	0	0	0	0	0	0	0	0
2/28/2018 2:15	0	0	0	0	0	0	0	0	0	0	0	0
2/28/2018 2:30	0	0	0	0	0	0	0	0	0	0	0	0
2/28/2018 2:45	0	0	0	0	0	0	0	0	0	0	0	0
2/28/2018 3:00	0	0	0	0	0	0	0	0	0	0	0	0
2/28/2018 3:15	0	0	0	0	0	0	0	0	0	0	0	0
2/28/2018 3:30	1	0	0	0	1	0	0	0	0	0	0	0
2/28/2018 3:45	0	0	0	1	0	0	0	0	0	0	0	0
2/28/2018 4:00	0	1	0	0	1	1	0	0	0	0	0	0
2/28/2018 4:15	0	0	1	0	0	0	0	0	1	0	2	0
2/28/2018 4:30	0	0	1	0	0	1	0	0	0	0	3	2
2/28/2018 4:45	5	0	4	0	1	1	2	0	0	0	10	1
2/28/2018 5:00	10	2	6	0	1	2	0	0	0	1	6	1
2/28/2018 5:15	19	2	13	1	2	1	1	0	3	0	8	1
2/28/2018 5:30	17	2	11	0	3	2	4	1	9	1	7	2
2/28/2018 5:45	34	3	18	1	9	6	4	0	18	1	17	6
2/28/2018 6:00	55	2	41	5	12	5	19	3	19	1	33	3
2/28/2018 6:15	53	5	33	1	12	14	23	3	31	0	53	5
2/28/2018 6:30	32	6	10	4	16	7	14	1	30	0	19	4
2/28/2018 6:45	18	3	5	7	6	3	9	3	34	0	11	0
2/28/2018 7:00	36	5	13	8	11	9	9	2	21	0	11	2
2/28/2018 7:15	14	4	3	3	15	6	11	5	32	1	7	2
2/28/2018 7:30	22	5	8	11	18	11	8	9	38	0	7	3
2/28/2018 7:45	10	8	7	12	16	11	10	10	36	1	3	2
2/28/2018 8:00	13	7	10	2	6	18	7	6	19	0	10	1
2/28/2018 8:15	12	2	5	4	9	4	10	3	5	0	3	3
2/28/2018 8:30	6	5	8	6	7	11	6	7	2	1	4	2
2/28/2018 8:45	4	5	8	3	6	13	1	3	0	0	1	2
2/28/2018 9:00	6	5	6	8	15	9	12	5	0	0	7	3
2/28/2018 9:15	4	3	9	12	10	5	5	3	0	0	3	4
2/28/2018 9:30	7	2	12	6	6	9	9	6	0	0	2	1
2/28/2018 9:45	4	6	6	5	8	8	4	9	0	0	5	3
2/28/2018 10:00	3	1	6	3	6	7	5	4	0	0	5	0
2/28/2018 10:15	2	4	4	9	6	7	6	7	0	0	4	5
2/28/2018 10:30	6	2	6	8	11	5	5	0	0	1	2	3
2/28/2018 10:45	5	13	12	7	12	4	6	13	1	0	2	8
2/28/2018 11:00	3	42	9	17	9	19	5	24	2	5	2	25
2/28/2018 11:15	17	25	6	15	6	11	5	10	1	8	5	18
2/28/2018 11:30	15	26	11	7	10	13	14	2	0	9	15	7
2/28/2018 11:45	34	13	22	6	10	13	12	9	7	2	13	6
2/28/2018 12:00	13	9	10	14	18	16	16	8	5	1	11	9
2/28/2018 12:15	15	12	9	11	10	14	7	9	4	3	6	3
2/28/2018 12:30	14	6	5	6	12	10	9	4	3	1	7	1
2/28/2018 12:45	12	5	6	6	12	5	5	6	0	3	3	3
2/28/2018 13:00	4	5	6	6	11	8	3	4	3	4	4	4
2/28/2018 13:15	4	5	5	5	8	12	8	7	1	1	3	2
2/28/2018 13:30	3	1	4	2	6	4	9	9	1	2	1	4
2/28/2018 13:45	7	1	7	6	11	8	3	9	0	1	2	0
2/28/2018 14:00	4	5	7	2	5	8	6	2	0	0	3	0
2/28/2018 14:15	4	7	9	11	9	7	8	6	0	0	2	7
2/28/2018 14:30	3	11	6	6	5	11	4	10	0	0	0	6
2/28/2018 14:45	8	12	5	6	9	10	6	6	5	4	2	5
2/28/2018 15:00	1	8	4	6	9	10	4	11	2	12	1	7
2/28/2018 15:15	2	11	3	5	6	6	9	11	0	12	3	3
2/28/2018 15:30	3	10	5	2	6	14	4	15	0	51	0	13
2/28/2018 15:45	4	22	6	5	6	12	2	12	0	18	3	10
2/28/2018 16:00	1	55	6	5	12	29	2	23	4	32	4	37
2/28/2018 16:15	6	28	4	11	4	17	4	9	0	59	0	10
2/28/2018 16:30	6	54	2	23	8	19	0	8	0	44	2	20
2/28/2018 16:45	5	76	1	64	11	10	1	11	1	32	3	35
2/28/2018 17:00	4	46	0	23	7	14	1	5	0	10	6	16
2/28/2018 17:15	5	15	0	7	5	6	0	3	0	14	3	8
2/28/2018 17:30	3	7	2	2	3	4	0	2	0	5	1	6
2/28/2018 17:45	3	6	0	4	3	2	0	0	1	0	0	8
2/28/2018 18:00	2	5	1	1	3	8	0	0	0	1	1	6
2/28/2018 18:15	1	7	1	3	2	0	1	0	0	0	1	4
2/28/2018 18:30	0	2	1	1	1	3	0	0	0	1	3	1
2/28/2018 18:45	0	9	0	0	0	7	0	0	2	0	1	2
2/28/2018 19:00	2	0	0	0	2	1	0	0	0	0	0	1
2/28/2018 19:15	0	0	0	0	0	0	0	0	0	0	0	2
2/28/2018 19:30	0	0	0	0	0	0	0	0	0	0	0	0
2/28/2018 19:45	0	0	0	0	0	0	0	0	0	0	0	0
2/28/2018 20:00	0	0	0	0	0	0	0	0	0	0	2	0
2/28/2018 20:15	0	0	0	0	0	0	0	0	0	0	0	1
2/28/2018 20:30	0	1	0	0	0	2	0	0	0	2	2	0
2/28/2018 20:45	0	0	0	1	1	0	0	0	0	0	1	1
2/28/2018 21:00	0	0	0	0	0	0	0	0	0	1	0	0
2/28/2018 21:15	0	0	0	0	0	0	0	0	1	0	0	0
2/28/2018 21:30	1	1	0	0	1	1	0	0	0	0	0	1
2/28/2018 21:45	1	0	0	0	1	0	0	0	0	0	2	3
2/28/2018 22:00	0	0	0	0	0	1	0	0	1	1	1	0
2/28/2018 22:15	0	1	6	0	0	5	0	0	0	0	0	0
2/28/2018 22:30	0	0	0	6	5	0	0	0	2	0	1	1
2/28/2018 22:45	0	0	0	0	0	0	0	0	0	0	0	0
2/28/2018 23:00	0	0	0	0	0	0	0	0	0	0	0	0
2/28/2018 23:15	1	0	0	0	1	0	1	0	0	0	0	0
2/28/2018 23:30	0	0	0	0	0	0	0	0	0	0	0	1
2/28/2018 23:45	0	0	0	0	0	0	0	0	0	1	0	0
AM Peak Hour	174	24	103	34	60	46	65	30	127	3	122	18
Midday Peak Hour	79	106	52	46	52	56	49	49	19	24	45	58
PM Peak Hour	21	213	21	121	35	77	19	61	5	167	14	102
24-Hour Volume	609	653	436	422	474	520	339	338	345	348	365	366
Average Speed	25	29	41	38	44	42	44	41	37	36	31	29
85% Speed	29	34	47	45	51	48	52	48	43	41	38	34

Intersection Turning Movement Count Summary

Intersection: Wise Road and Dollarway Road
Date: 2/28/2018
Weather: Dry

BEGIN TIME	Eastbound				Westbound				Northbound				Southbound				
	Wise Road				*Wise Road*				*Dollarway Road*				*Dollarway Road*				
	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		TOTAL
5:30 AM	0	0	0	0	2	0	1	0	0	2	5	0	2	13	0	0	25
5:45 AM	0	0	0	0	4	0	1	0	0	5	11	0	9	8	0	0	38
6:00 AM	0	0	0	0	3	0	0	0	0	2	26	0	7	11	0	0	49
6:15 AM	0	0	0	0	4	0	1	0	0	13	42	0	15	18	0	0	93
6:30 AM	0	0	0	0	3	0	2	0	0	6	15	2	5	21	0	0	52
6:45 AM	0	0	0	0	0	0	0	0	0	10	8	2	5	27	0	1	50
7:00 AM	0	0	0	0	0	0	1	0	0	7	5	1	3	23	0	2	39
7:15 AM	0	0	0	0	2	0	0	0	0	12	6	3	2	29	0	0	51
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM PEAK HR 6:00 AM - 7:00 AM	0	0	0	0	10	0	3	0	0	31	91	4	32	77	0	1	244
PHF					0.63		0.38			0.60	0.54		0.53	0.71			
Approach Truck %					0.0%				3.3%				0.9%				

BEGIN TIME	Eastbound				Westbound				Northbound				Southbound				
	Wise Road				*Wise Road*				*Dollarway Road*				*Dollarway Road*				
	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		TOTAL
11:00 AM	0	0	0	0	26	0	2	2	0	20	2	0	0	31	0	0	81
11:15 AM	0	0	0	0	15	0	3	0	0	14	4	0	2	17	0	0	55
11:30 AM	0	0	0	0	8	0	0	0	0	28	14	0	1	25	0	6	76
11:45 AM	0	0	0	0	3	0	2	0	0	21	12	1	3	20	0	0	61
12:00 PM	0	0	0	0	6	0	2	1	0	22	11	1	1	15	0	1	57
12:15 PM	0	0	0	0	3	0	0	1	0	27	3	3	1	24	0	2	58
12:30 PM	0	0	0	0	1	0	0	0	0	21	5	0	1	28	0	2	56
12:45 PM	0	0	0	0	1	0	0	1	0	23	3	1	0	18	0	0	45
1:00 PM	0	0	0	0	2	0	0	1	0	21	3	1	0	17	0	1	43
1:15 PM	0	0	0	0	1	0	0	1	0	26	2	1	0	17	0	0	46
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MIDDAY PEAK HR 11:00 AM - 12:00 PM	0	0	0	0	52	0	7	2	0	83	32	1	6	93	0	6	273
PHF					0.50		0.58			0.74	0.57		0.50	0.75			
Approach Truck %					3.4%				0.9%				6.1%				

BEGIN TIME	Eastbound				Westbound				Northbound				Southbound				
	Wise Road				*Wise Road*				*Dollarway Road*				*Dollarway Road*				
	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		TOTAL
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	8	0	3	0	0	48	0	2	2	23	0	0	84
4:00 PM	0	0	0	0	26	0	14	0	0	29	3	1	1	21	0	0	94
4:15 PM	0	0	0	0	8	0	2	0	0	26	0	0	0	29	0	3	65
4:30 PM	0	0	0	0	12	0	8	0	0	42	3	0	0	34	0	3	99
4:45 PM	0	0	0	0	28	0	7	0	0	29	1	0	0	19	0	0	84
5:00 PM	0	0	0	0	11	0	5	0	0	50	3	0	3	16	0	1	88
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM PEAK HOUR 3:45 PM - 4:45 PM	0	0	0	0	54	0	27	0	0	145	6	3	3	107	0	6	342
PHF					0.52		0.48			0.76	0.50		0.38	0.79			
Approach Truck %					0.0%				2.0%				5.5%				

Intersection Turning Movement Count Summary

Intersection: Wise Road and Dollarway Road
Date: 2/28/2018
Weather: Dry

BEGIN TIME	Eastbound				Westbound				Northbound				Southbound			
	Wise Road				*Wise Road*				*Dollarway Road*				*Dollarway Road*			
	Bikes			Peds	Bikes			Peds	Bikes			Peds	Bikes			Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
5:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM PEAK HR 6:00 AM - 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

BEGIN TIME	Eastbound				Westbound				Northbound				Southbound			
	Wise Road				*Wise Road*				*Dollarway Road*				*Dollarway Road*			
	Bikes			Peds	Bikes			Peds	Bikes			Peds	Bikes			Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MIDDAY PEAK HR 11:00 AM - 12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6

BEGIN TIME	Eastbound				Westbound				Northbound				Southbound			
	Wise Road				*Wise Road*				*Dollarway Road*				*Dollarway Road*			
	Bikes			Peds	Bikes			Peds	Bikes			Peds	Bikes			Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM PEAK HOUR 3:45 PM - 4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Intersection Turning Movement Count Summary

Intersection: Wise Road and Atkisson Road
Date: 2/28/2018
Weather: Dry

BEGIN TIME	Eastbound				Westbound				Northbound				Southbound				
	Wise Road				*Wise Road*				*Atkisson Road*				*Atkisson Road*				
	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		TOTAL
5:30 AM	3	4	0	0	0	1	0	0	0	0	0	0	0	0	1	1	9
5:45 AM	8	9	0	1	0	3	0	0	0	0	0	0	0	0	0	0	20
6:00 AM	18	15	0	0	0	4	0	0	0	0	0	0	0	0	0	0	37
6:15 AM	28	25	0	0	0	4	0	0	0	0	0	0	1	0	0	0	58
6:30 AM	5	11	0	0	0	3	2	0	0	0	0	0	0	0	0	0	21
6:45 AM	3	8	0	0	0	1	0	0	0	0	0	0	0	0	0	0	12
7:00 AM	3	7	0	0	0	1	0	0	0	0	0	0	0	0	0	0	11
7:15 AM	2	4	0	0	0	1	0	0	0	0	0	0	0	0	1	0	8
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM PEAK HR 5:45 AM - 6:45 AM	59	60	0	1	0	14	2	0	0	0	0	0	1	0	0	0	136
PHF	0.53	0.60				0.88	0.25						0.25				
Approach Truck %	0.8%				0.0%								0.0%				

BEGIN TIME	Eastbound				Westbound				Northbound				Southbound				
	Wise Road				*Wise Road*				*Atkisson Road*				*Atkisson Road*				
	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		TOTAL
11:00 AM	1	1	0	0	0	7	0	0	0	0	0	0	0	0	20	0	29
11:15 AM	2	3	0	0	0	7	0	0	0	0	0	0	0	0	9	0	21
11:30 AM	9	4	0	0	0	4	0	0	0	0	0	0	1	0	1	0	19
11:45 AM	6	5	0	1	0	4	1	1	0	0	0	0	1	0	2	0	19
12:00 PM	8	6	0	1	0	4	0	2	0	0	0	0	0	0	3	0	21
12:15 PM	2	3	0	0	0	0	0	0	0	0	0	0	1	0	2	0	8
12:30 PM	4	1	0	3	0	0	0	0	0	0	0	0	0	0	1	0	6
12:45 PM	1	3	0	0	0	0	0	0	0	0	0	0	1	0	2	1	7
1:00 PM	0	3	0	0	0	2	0	1	0	0	0	0	0	0	2	1	7
1:15 PM	2	2	0	1	0	0	0	0	0	0	0	0	0	0	1	1	5
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MIDDAY PEAK HR 11:00 AM - 12:00 PM	18	13	0	1	0	22	1	1	0	0	0	0	2	0	32	0	88
PHF	0.50	0.65				0.79	0.25						0.50		0.40		
Approach Truck %	3.2%				4.3%								0.0%				

BEGIN TIME	Eastbound				Westbound				Northbound				Southbound				
	Wise Road				*Wise Road*				*Atkisson Road*				*Atkisson Road*				
	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		TOTAL
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	2	0	0	0	10	0	0	0	0	0	0	0	0	1	0	13
4:00 PM	1	3	0	0	0	21	0	0	0	0	0	0	0	0	16	0	41
4:15 PM	0	0	0	0	0	4	0	0	0	0	0	0	0	0	3	0	7
4:30 PM	0	0	0	0	0	10	0	0	0	0	0	0	0	0	7	0	17
4:45 PM	0	1	0	0	0	14	0	0	0	0	0	0	0	0	15	0	30
5:00 PM	0	5	0	0	0	4	0	0	0	0	0	0	0	0	4	0	13
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM PEAK HOUR 4:00 PM - 5:00 PM	1	4	0	0	0	49	0	0	0	0	0	0	0	0	41	0	95
PHF	0.25	0.33				0.58									0.64		
Approach Truck %	0.0%				0.0%								0.0%				

Intersection Turning Movement Count Summary

Intersection: Wise Road and Atkisson Road
Date: 2/28/2018
Weather: Dry

BEGIN TIME	Eastbound				Westbound				Northbound				Southbound			
	Wise Road				*Wise Road*				*Atkisson Road*				*Atkisson Road*			
	Bikes			Peds	Bikes			Peds	Bikes			Peds	Bikes			Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
5:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM PEAK HR 5:45 AM - 6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

BEGIN TIME	Eastbound				Westbound				Northbound				Southbound			
	Wise Road				*Wise Road*				*Atkisson Road*				*Atkisson Road*			
	Bikes			Peds	Bikes			Peds	Bikes			Peds	Bikes			Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MIDDAY PEAK HR 11:00 AM - 12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

BEGIN TIME	Eastbound				Westbound				Northbound				Southbound			
	Wise Road				*Wise Road*				*Atkisson Road*				*Atkisson Road*			
	Bikes			Peds	Bikes			Peds	Bikes			Peds	Bikes			Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM PEAK HOUR 4:00 PM - 5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Intersection Turning Movement Count Summary

Intersection: Hoadle□Road and □ollar□a□Road
Date: 2□27□2018
Weather: □r□

BEGIN TIME	Eastbound *Hoadley Road*				Westbound *Hoadley Road*				Northbound *Dollarway Road*				Southbound *Dollarway Road*				
	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		TOTAL
5:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 AM	8	27	4	0	1	0	0	0	7	11	13	1	0	1□	□	0	91
6:00 AM	19	3□	3	0	1	2	0	0	4	13	24	0	0	14	4	0	119
6:15 AM	31	40	1	0	2	0	0	0	12	30	18	0	2	23	9	0	168
6:30 AM	□	23	4	0	3	1	0	0	7	12	10	2	2	23	8	0	98
6:45 AM	10	18	1	0	2	□	0	0	□	11	10	2	1	41	8	1	112
7:00 AM	3	11	8	0	3	1	0	0	17	17	16	4	1	22	8	1	107
7:15 AM	4	9	8	0	1	2	0	0	1□	22	9	3	0	27	18	1	11□
7:30 AM	3	12	12	1	1	3	0	1	2□	13	7	1	1	42	21	3	140
7:45 AM	10	6	22	9	□	6	0	0	68	12	9	4	1	42	3□	2	216
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM PEAK HR 7:00 AM - 8:00 AM	20	38	□0	10	10	12	0	1	12□	64	41	12	3	133	82	7	□78
PHF	0.□0	0.79	0.□7		0.□0	0.□0			0.46	0.73	0.64		0.7□	0.79	0.□9		
Approach Truck %	9.3□				4.□□				□.2□				3.2□				

BEGIN TIME	Eastbound *Hoadley Road*				Westbound *Hoadley Road*				Northbound *Dollarway Road*				Southbound *Dollarway Road*				
	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		TOTAL
11:00 AM	6	1	11	3	34	16	0	1	10	19	8	3	0	36	11	2	1□2
11:15 AM	13	□	□	2	22	6	1	0	20	32	14	□	0	36	8	4	162
11:30 AM	7	9	1□	2	1□	2	0	0	6	37	12	1	0	28	8	2	139
11:45 AM	6	9	8	0	12	7	0	0	13	34	26	3	0	2□	6	1	146
12:00 PM	7	9	8	1	13	1	0	1	13	36	17	0	0	33	1	2	138
12:15 PM	6	4	12	1	3	0	2	2	20	27	16	2	3	24	4	0	121
12:30 PM	4	□	6	0	8	2	2	0	11	29	12	3	0	23	9	2	111
12:45 PM	1	8	11	1	3	2	0	0	17	31	7	4	0	26	4	□	110
1:00 PM	3	6	19	4	2	3	0	0	13	23	2	1	1	21	6	2	99
1:15 PM	8	1	6	1	3	2	0	0	1□	24	1	2	0	28	□	0	93
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MIDDAY PEAK HR 11:00 AM - 12:00 PM	32	24	39	7	83	31	1	1	49	122	60	12	0	12□	33	9	□99
PHF	0.62	0.67	0.6□		0.61	0.48	0.2□		0.61	0.82	0.□8			0.87	0.7□		
Approach Truck %	7.4□				0.9□				□.2□				□.7□				

BEGIN TIME	Eastbound *Hoadley Road*				Westbound *Hoadley Road*				Northbound *Dollarway Road*				Southbound *Dollarway Road*				
	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		TOTAL
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	12	6	8	1	17	36	1	0	23	47	4	1	0	46	1□	3	21□
4:15 PM	10	3	19	1	14	31	2	0	29	46	2	3	1	42	18	2	217
4:30 PM	16	7	13	2	23	29	0	0	29	□0	3	3	0	48	16	3	234
4:45 PM	14	3	9	0	30	□2	1	0	27	□8	4	3	0	□0	14	0	262
5:00 PM	16	2	21	0	17	32	1	0	32	68	11	0	0	30	18	2	248
5:15 PM	10	3	21	0	11	8	1	0	19	□7	□	0	0	30	7	1	172
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM PEAK HOUR 4:15 PM - 5:15 PM	□6	1□	62	3	84	144	4	0	117	222	20	9	1	170	66	7	961
PHF	0.88	0.□4	0.74		0.70	0.69	0.□0		0.91	0.82	0.4□		0.2□	0.8□	0.92		
Approach Truck %	2.3□				0.0□				2.□□				3.0□				

Gannett Fleming
Camp Hill, PA
717-763-7211

Intersection Turning Movement Count Summary

Intersection: Hoadle□Road and □ollar□a□Road
Date: 2□27□2018
Weather: □r□

BEGIN TIME	Eastbound				Westbound				Northbound				Southbound			
	Hoadley Road				*Hoadley Road*				*Dollarway Road*				*Dollarway Road*			
	Bikes			Peds	Bikes			Peds	Bikes			Peds	Bikes			Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
5:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM PEAK HR 7:00 AM - 8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BEGIN TIME	**Eastbound**				**Westbound**				**Northbound**				**Southbound**			
	Hoadley Road				*Hoadley Road*				*Dollarway Road*				*Dollarway Road*			
	Bikes			Peds	Bikes			Peds	Bikes			Peds	Bikes			Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	□
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MIDDAY PEAK HR 11:00 AM - 12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
BEGIN TIME	**Eastbound**				**Westbound**				**Northbound**				**Southbound**			
	Hoadley Road				*Hoadley Road*				*Dollarway Road*				*Dollarway Road*			
	Bikes			Peds	Bikes			Peds	Bikes			Peds	Bikes			Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM PEAK HOUR 4:15 PM - 5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Intersection Turning Movement Count Summary

Intersection: Hoadle□Road and Sibert Road
Date: 2□27□2018
Weather: □r□

BEGIN TIME	Eastbound *Hoadley Road*				Westbound *Hoadley Road*				Northbound *Sibert Road*				Southbound *Sibert Road*				
	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		TOTAL
5:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 AM	10	22	□	0	1	0	0	0	0	0	0	0	2	0	0	0	40
6:00 AM	14	30	10	0	1	0	0	0	0	2	0	0	7	1	2	0	67
6:15 AM	1□	27	26	0	2	0	0	0	0	1	2	0	4	9	2	0	88
6:30 AM	10	8	1□	0	3	0	2	0	1	1	3	1	2	3	3	0	□1
6:45 AM	8	3	11	0	□	0	4	0	1	3	2	0	3	3	3	1	46
7:00 AM	8	11	14	0	2	0	□	0	0	4	0	1	2	4	1	0	□1
7:15 AM	□	2	4	0	3	1	□	0	1	2	4	0	3	3	2	0	3□
7:30 AM	11	3	□	0	□	2	3	0	1	7	2	0	2	8	1	3	□0
7:45 AM	8	0	2	0	□	1	2	0	2	7	6	0	3	2	6	0	44
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM PEAK HR 6:00 AM - 7:00 AM	47	68	62	0	11	0	6	0	2	7	7	1	16	16	10	1	2□2
PHF	0.78	0.□7	0.60		0.□□		0.38		0.□0	0.□8	0.□8		0.□7	0.44	0.83		
Approach Truck %	0.0□				0.0□				6.3□				2.4□				

BEGIN TIME	Eastbound *Hoadley Road*				Westbound *Hoadley Road*				Northbound *Sibert Road*				Southbound *Sibert Road*				
	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		TOTAL
11:00 AM	3	2	2	0	3	17	6	0	22	0	1	0	1	4	10	0	71
11:15 AM	3	□	4	0	2	14	2	0	7	2	3	0	1	4	4	0	□1
11:30 AM	3	8	6	0	1	2	3	0	2	0	2	0	2	0	9	0	38
11:45 AM	9	11	8	0	2	0	1	0	8	3	2	0	□	4	4	1	□7
12:00 PM	8	4	13	0	6	3	7	0	3	□	3	0	3	□	6	0	66
12:15 PM	9	6	6	0	6	3	3	0	4	3	2	0	1	□	0	3	48
12:30 PM	10	4	□	0	3	1	2	0	3	10	1	2	6	2	3	0	□0
12:45 PM	4	1	4	0	3	1	1	0	2	4	2	0	4	□	1	0	32
1:00 PM	2	□	1	0	□	3	2	0	2	3	4	1	4	3	□	0	39
1:15 PM	3	2	3	0	2	2	□	0	3	3	3	0	□	10	0	3	41
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MIDDAY PEAK HR 11:45 AM - 12:45 PM	36	2□	32	0	17	7	13	0	18	21	8	2	1□	16	13	4	221
PHF	0.90	0.□7	0.62		0.71	0.□8	0.46		0.□6	0.□3	0.67		0.63	0.80	0.□4		
Approach Truck %	0.0□				0.0□				4.3□				9.1□				

BEGIN TIME	Eastbound *Hoadley Road*				Westbound *Hoadley Road*				Northbound *Sibert Road*				Southbound *Sibert Road*				
	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		TOTAL
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	4	1	0	0	3	6	2	0	17	7	6	0	6	2	17	0	71
4:15 PM	2	1	0	0	0	18	2	0	11	4	4	0	1	1	16	0	60
4:30 PM	□	0	1	0	1	24	1	0	11	1	1	0	1	0	12	0	□8
4:45 PM	3	0	0	0	0	□4	6	0	16	4	0	0	0	2	12	0	97
5:00 PM	9	0	0	0	0	16	2	0	10	1	0	0	0	0	1□	0	□3
5:15 PM	2	1	1	0	1	6	1	0	3	0	0	0	0	0	9	0	24
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM PEAK HOUR 4:00 PM - 5:00 PM	14	2	1	0	4	102	11	0	□□	16	11	0	8	□	□7	0	286
PHF	0.70	0.□0	0.2□		0.33	0.47	0.46		0.81	0.□7	0.46		0.33	0.63	0.84		
Approach Truck %	0.0□				0.0□				0.0□				0.0□				

Gannett Fleming
Camp Hill, PA
717-763-7211

Intersection Turning Movement Count Summary

Intersection: Hoadle□Road and Sibert Road
Date: 2□27□2018
Weather: □r□

BEGIN TIME	Eastbound *Hoadley Road*				Westbound *Hoadley Road*				Northbound *Sibert Road*				Southbound *Sibert Road*			
	Bikes			Peds	Bikes			Peds	Bikes			Peds	Bikes			Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
5:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM PEAK HR 6:00 AM - 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

BEGIN TIME	Eastbound *Hoadley Road*				Westbound *Hoadley Road*				Northbound *Sibert Road*				Southbound *Sibert Road*			
	Bikes			Peds	Bikes			Peds	Bikes			Peds	Bikes			Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MIDDAY PEAK HR 11:45 AM - 12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4

BEGIN TIME	Eastbound *Hoadley Road*				Westbound *Hoadley Road*				Northbound *Sibert Road*				Southbound *Sibert Road*			
	Bikes			Peds	Bikes			Peds	Bikes			Peds	Bikes			Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM PEAK HOUR 4:00 PM - 5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Gannett Fleming
Camp Hill, PA
717-763-7211

Intersection Turning Movement Count Summary

Intersection: Stark Gate Road and Dollarway Road
Date: 3/1/2018
Weather: Dry

BEGIN TIME	Eastbound				Westbound				Northbound				Southbound				
	Stark Gate Road				*Stark Gate Road*				*Dollarway Road*				*Dollarway Road*				
	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		TOTAL
5:30 AM	0	0	0	0	1	0	0	0	0	2	6	0	2	15	0	0	26
5:45 AM	0	0	0	0	3	0	1	0	0	4	11	0	2	16	0	0	37
6:00 AM	0	0	0	0	0	0	0	0	0	3	7	0	5	15	0	0	30
6:15 AM	0	0	0	0	0	0	1	0	0	13	17	0	11	21	0	0	63
6:30 AM	0	0	0	0	1	0	0	0	0	19	28	0	8	19	0	0	75
6:45 AM	0	0	0	0	2	0	0	0	0	15	29	4	4	20	0	1	70
7:00 AM	0	0	0	0	1	0	0	1	0	6	25	1	7	27	0	1	66
7:15 AM	0	0	0	0	3	0	1	1	0	11	13	2	11	27	0	0	66
7:30 AM	0	0	0	0	2	0	0	0	0	12	17	0	15	38	0	1	84
7:45 AM	0	0	0	0	0	0	0	0	0	7	24	0	17	37	0	1	85
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM PEAK HR 7:00 AM - 8:00 AM	0	0	0	0	6	0	1	2	0	36	79	3	50	129	0	3	301
PHF					0.50		0.25			0.75	0.79		0.74	0.85			
Approach Truck %					28.6%				2.6%				1.7%				

BEGIN TIME	Eastbound				Westbound				Northbound				Southbound				
	Stark Gate Road				*Stark Gate Road*				*Dollarway Road*				*Dollarway Road*				
	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		TOTAL
11:00 AM	0	0	0	0	3	0	1	0	0	13	3	0	0	19	0	6	39
11:15 AM	0	0	0	0	3	0	2	0	0	16	4	0	1	22	0	2	48
11:30 AM	0	0	0	0	11	0	7	0	0	10	4	0	0	17	0	0	49
11:45 AM	0	0	0	0	5	0	3	0	0	15	7	1	1	20	0	0	51
12:00 PM	0	0	0	0	4	0	1	0	0	11	6	0	1	14	0	0	37
12:15 PM	0	0	0	0	4	0	2	0	0	17	3	1	3	14	0	0	43
12:30 PM	0	0	0	0	2	0	2	1	0	14	6	0	1	11	0	0	36
12:45 PM	0	0	0	0	1	0	5	0	0	19	4	0	1	21	0	1	51
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MIDDAY PEAK HR 11:00 AM - 12:00 PM	0	0	0	0	22	0	13	0	0	54	18	1	2	78	0	8	187
PHF					0.50		0.46			0.84	0.64		0.50	0.89			
Approach Truck %					0.0%				1.4%				10.0%				

BEGIN TIME	Eastbound				Westbound				Northbound				Southbound				
	Stark Gate Road				*Stark Gate Road*				*Dollarway Road*				*Dollarway Road*				
	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		TOTAL
3:00 PM	0	0	0	0	17	0	5	0	0	22	1	1	1	22	0	0	68
3:15 PM	0	0	0	0	9	0	8	0	0	25	3	0	3	14	0	0	62
3:30 PM	0	0	0	0	38	0	13	1	0	28	9	2	3	22	0	0	113
3:45 PM	0	0	0	0	12	0	7	0	0	38	4	2	0	30	0	0	91
4:00 PM	0	0	0	0	23	0	19	1	0	36	7	1	1	14	0	1	100
4:15 PM	0	0	0	0	26	0	15	0	0	34	6	0	0	24	0	1	105
4:30 PM	0	0	0	0	30	0	22	0	0	37	6	0	1	22	0	1	118
4:45 PM	0	0	0	0	13	0	20	0	0	35	3	1	1	25	0	0	97
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM PEAK HOUR 4:00 PM - 5:00 PM	0	0	0	0	92	0	76	1	0	142	22	2	3	85	0	3	420
PHF					0.77		0.86			0.96	0.79		0.75	0.85			
Approach Truck %					0.6%				1.2%				3.4%				

Intersection Turning Movement Count Summary

Intersection: Stark Gate Road and Dollarway Road
Date: 3/1/2018
Weather: Dry

BEGIN TIME	Eastbound				Westbound				Northbound				Southbound			
	Stark Gate Road				*Stark Gate Road*				*Dollarway Road*				*Dollarway Road*			
	Bikes			Peds	Bikes			Peds	Bikes			Peds	Bikes			Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
5:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM PEAK HR 7:00 AM - 8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

BEGIN TIME	Eastbound				Westbound				Northbound				Southbound			
	Stark Gate Road				*Stark Gate Road*				*Dollarway Road*				*Dollarway Road*			
	Bikes			Peds	Bikes			Peds	Bikes			Peds	Bikes			Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MIDDAY PEAK HR 11:00 AM - 12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8

BEGIN TIME	Eastbound				Westbound				Northbound				Southbound			
	Stark Gate Road				*Stark Gate Road*				*Dollarway Road*				*Dollarway Road*			
	Bikes			Peds	Bikes			Peds	Bikes			Peds	Bikes			Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM PEAK HOUR 4:00 PM - 5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Intersection Turning Movement Count Summary

Intersection: Romer Road and Hanlon Road
Date: 3/1/2018
Weather: Dry

BEGIN TIME	Eastbound Romer Road				Westbound Romer Road				Northbound Hanlon Road				Southbound Hanlon Road				
	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		TOTAL
5:30 AM	0	6	0	0	0	2	0	0	0	0	0	0	0	0	0	0	8
5:45 AM	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15
6:00 AM	0	12	0	0	0	0	0	0	1	0	0	0	0	0	0	0	13
6:15 AM	0	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26
6:30 AM	0	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34
6:45 AM	0	33	0	0	0	1	0	0	0	0	0	0	0	0	0	0	34
7:00 AM	0	32	0	0	0	0	0	0	0	0	1	0	0	0	0	0	33
7:15 AM	0	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21
7:30 AM	0	31	0	0	0	1	0	0	0	0	0	0	0	0	0	0	32
7:45 AM	0	41	0	0	2	0	0	1	0	0	0	0	0	0	0	0	43
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM PEAK HR 7:00 AM - 8:00 AM	0	125	0	0	2	1	0	1	0	0	1	0	0	0	0	0	129
PHF		0.76			0.25	0.25					0.25						
Approach Truck %		0.0%				33.3%				0.0%							

BEGIN TIME	Eastbound Romer Road				Westbound Romer Road				Northbound Hanlon Road				Southbound Hanlon Road				
	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		TOTAL
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	3	0	0	0	6	0	0	0	0	0	0	0	0	0	0	9
11:30 AM	0	2	0	0	0	14	0	0	0	0	0	0	0	0	0	0	16
11:45 AM	0	4	0	0	0	2	0	0	0	0	0	0	0	0	0	0	6
12:00 PM	0	6	0	0	1	4	0	1	0	0	0	0	0	0	0	0	11
12:15 PM	0	6	0	0	0	2	0	0	0	0	1	1	0	0	0	0	9
12:30 PM	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
12:45 PM	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	4
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MIDDAY PEAK HR 11:15 AM - 12:15 PM	0	15	0	0	1	26	0	1	0	0	0	0	0	0	0	0	42
PHF		0.63			0.25	0.46											
Approach Truck %		0.0%				3.7%											

BEGIN TIME	Eastbound Romer Road				Westbound Romer Road				Northbound Hanlon Road				Southbound Hanlon Road				
	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	Vehicles			Trucks	
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		TOTAL
3:00 PM	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	16
3:15 PM	0	0	0	0	0	16	0	0	0	0	1	0	0	0	0	0	17
3:30 PM	0	0	1	0	0	43	0	0	2	0	1	1	0	0	0	0	47
3:45 PM	0	1	0	0	0	12	0	0	0	0	0	0	0	0	0	0	13
4:00 PM	0	1	0	0	1	33	0	0	0	0	0	0	0	0	0	0	35
4:15 PM	0	0	0	0	0	40	0	0	1	0	0	0	0	0	0	0	41
4:30 PM	0	1	1	0	0	54	0	0	0	0	0	0	0	0	0	0	56
4:45 PM	0	0	0	0	0	33	0	0	1	0	0	0	0	0	0	0	34
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM PEAK HOUR 4:00 PM - 5:00 PM	0	2	1	0	1	160	0	0	2	0	0	0	0	0	0	0	166
PHF		0.50	0.25		0.25	0.74			0.50								
Approach Truck %		0.0%				0.0%				0.0%							

Intersection Turning Movement Count Summary

Intersection: Romer Road and Hanlon Road
Date: 3/1/2018
Weather: Dry

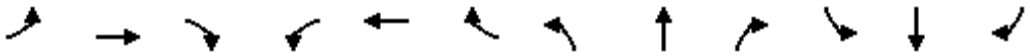
BEGIN TIME	Eastbound				Westbound				Northbound				Southbound			
	Romer Road				*Romer Road*				*Hanlon Road*				*Hanlon Road*			
	Bikes			Peds	Bikes			Peds	Bikes			Peds	Bikes			Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
5:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM PEAK HR 7:00 AM - 8:00 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0

BEGIN TIME	Eastbound				Westbound				Northbound				Southbound			
	Romer Road				*Romer Road*				*Hanlon Road*				*Hanlon Road*			
	Bikes			Peds	Bikes			Peds	Bikes			Peds	Bikes			Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MIDDAY PEAK HR 11:15 AM - 12:15 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0

BEGIN TIME	Eastbound				Westbound				Northbound				Southbound			
	Romer Road				*Romer Road*				*Hanlon Road*				*Hanlon Road*			
	Bikes			Peds	Bikes			Peds	Bikes			Peds	Bikes			Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM PEAK HOUR 4:00 PM - 5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

APPENDIX B

SYNCHRO ANALYSES



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	68	62	11	0	6	2	7	7	16	16	10
Future Volume (vph)	47	68	62	11	0	6	2	7	7	16	16	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		190	0		0	0		0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.951				0.850		0.942			0.979	
Flt Protected		0.989			0.950			0.993			0.982	
Satd. Flow (prot)	0	1752	0	0	1770	1583	0	1677	0	0	1791	0
Flt Permitted		0.989			0.950			0.993			0.982	
Satd. Flow (perm)	0	1752	0	0	1770	1583	0	1677	0	0	1791	0
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		303			594			422			385	
Travel Time (s)		5.9			11.6			7.2			6.6	
Peak Hour Factor	0.78	0.57	0.60	0.55	0.92	0.38	0.50	0.58	0.58	0.57	0.44	0.83
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	6%	6%	6%	2%	2%	2%
Adj. Flow (vph)	60	119	103	20	0	16	4	12	12	28	36	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	282	0	0	20	16	0	28	0	0	76	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 28.7%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	47	68	62	11	0	6	2	7	7	16	16	10
Future Vol, veh/h	47	68	62	11	0	6	2	7	7	16	16	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	190	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	57	60	55	92	38	50	58	58	57	44	83
Heavy Vehicles, %	2	2	2	2	2	2	6	6	6	2	2	2
Mvmt Flow	60	119	103	20	0	16	4	12	12	28	36	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	132	130	42	235	130	18	48	0	0	24	0	0
Stage 1	98	98	-	26	26	-	-	-	-	-	-	-
Stage 2	34	32	-	209	104	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.16	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.254	-	-	2.218	-	-
Pot Cap-1 Maneuver	840	761	1029	720	761	1061	1534	-	-	1591	-	-
Stage 1	908	814	-	992	874	-	-	-	-	-	-	-
Stage 2	982	868	-	793	809	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	814	745	1029	559	745	1061	1534	-	-	1591	-	-
Mov Cap-2 Maneuver	814	745	-	559	745	-	-	-	-	-	-	-
Stage 1	905	799	-	989	871	-	-	-	-	-	-	-
Stage 2	964	865	-	596	794	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.4	10.2	1	2.7
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1534	-	-	846	559	1061	1591	-	-
HCM Lane V/C Ratio	0.003	-	-	0.334	0.036	0.015	0.018	-	-
HCM Control Delay (s)	7.4	0	-	11.4	11.7	8.4	7.3	0	-
HCM Lane LOS	A	A	-	B	B	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1.5	0.1	0	0.1	-	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	10	3	31	91	32	77
Future Volume (vph)	10	3	31	91	32	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125	0		0	0	
Storage Lanes	1	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.897			
Flt Protected	0.950					0.982
Satd. Flow (prot)	1770	1583	1655	0	0	1829
Flt Permitted	0.950					0.982
Satd. Flow (perm)	1770	1583	1655	0	0	1829
Link Speed (mph)	25		55			55
Link Distance (ft)	263		258			236
Travel Time (s)	7.2		3.2			2.9
Peak Hour Factor	0.63	0.38	0.60	0.54	0.53	0.71
Heavy Vehicles (%)	2%	2%	3%	3%	2%	2%
Adj. Flow (vph)	16	8	52	169	60	108
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	8	221	0	0	168
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 26.4%		ICU Level of Service A	
Analysis Period (min) 15			

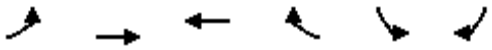
Intersection	
Int Delay, s/veh	1.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	3	31	91	32	77
Future Vol, veh/h	10	3	31	91	32	77
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	63	38	60	54	53	71
Heavy Vehicles, %	2	2	3	3	2	2
Mvmt Flow	16	8	52	169	60	108

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	365	137	0	0	221	0
Stage 1	137	-	-	-	-	-
Stage 2	228	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	635	911	-	-	1348	-
Stage 1	890	-	-	-	-	-
Stage 2	810	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	605	911	-	-	1348	-
Mov Cap-2 Maneuver	605	-	-	-	-	-
Stage 1	848	-	-	-	-	-
Stage 2	810	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.4	0	2.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	605	911	1348	-
HCM Lane V/C Ratio	-	-	0.026	0.009	0.045	-
HCM Control Delay (s)	-	-	11.1	9	7.8	0
HCM Lane LOS	-	-	B	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	0.1	-



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	59	60	14	2	1	0
Future Volume (vph)	59	60	14	2	1	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.955			
Flt Protected		0.974			0.950	
Satd. Flow (prot)	0	1814	1779	0	1770	0
Flt Permitted		0.974			0.950	
Satd. Flow (perm)	0	1814	1779	0	1770	0
Link Speed (mph)		25	25		25	
Link Distance (ft)		267	203		489	
Travel Time (s)		7.3	5.5		13.3	
Peak Hour Factor	0.53	0.60	0.88	0.25	0.25	0.92
Adj. Flow (vph)	111	100	16	8	4	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	211	24	0	4	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 23.1%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	59	60	14	2	1	0
Future Vol, veh/h	59	60	14	2	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	53	60	88	25	25	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	111	100	16	8	4	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	24	0	-	0	342	20
Stage 1	-	-	-	-	20	-
Stage 2	-	-	-	-	322	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1591	-	-	-	654	1058
Stage 1	-	-	-	-	1003	-
Stage 2	-	-	-	-	735	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1591	-	-	-	606	1058
Mov Cap-2 Maneuver	-	-	-	-	606	-
Stage 1	-	-	-	-	929	-
Stage 2	-	-	-	-	735	-

Approach	EB	WB	SB
HCM Control Delay, s	3.9	0	11
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1591	-	-	-	606
HCM Lane V/C Ratio	0.07	-	-	-	0.007
HCM Control Delay (s)	7.4	0	-	-	11
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	6	1	36	79	50	129
Future Volume (vph)	6	1	36	79	50	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.966		0.909			
Flt Protected	0.964					0.985
Satd. Flow (prot)	1372	0	1677	0	0	1835
Flt Permitted	0.964					0.985
Satd. Flow (perm)	1372	0	1677	0	0	1835
Link Speed (mph)	25		45			45
Link Distance (ft)	271		279			285
Travel Time (s)	7.4		4.2			4.3
Peak Hour Factor	0.50	0.25	0.75	0.79	0.74	0.85
Heavy Vehicles (%)	29%	29%	3%	3%	2%	2%
Adj. Flow (vph)	12	4	48	100	68	152
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	148	0	0	220
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 26.2%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	6	1	36	79	50	129
Future Vol, veh/h	6	1	36	79	50	129
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	50	25	75	79	74	85
Heavy Vehicles, %	29	29	3	3	2	2
Mvmt Flow	12	4	48	100	68	152

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	386	98	0	0	148	0
Stage 1	98	-	-	-	-	-
Stage 2	288	-	-	-	-	-
Critical Hdwy	6.69	6.49	-	-	4.12	-
Critical Hdwy Stg 1	5.69	-	-	-	-	-
Critical Hdwy Stg 2	5.69	-	-	-	-	-
Follow-up Hdwy	3.761	3.561	-	-	2.218	-
Pot Cap-1 Maneuver	568	889	-	-	1434	-
Stage 1	863	-	-	-	-	-
Stage 2	703	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	538	889	-	-	1434	-
Mov Cap-2 Maneuver	538	-	-	-	-	-
Stage 1	818	-	-	-	-	-
Stage 2	703	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.2	0	2.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	597	1434	-
HCM Lane V/C Ratio	-	-	0.027	0.047	-
HCM Control Delay (s)	-	-	11.2	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	125	0	2	1	0	1
Future Volume (vph)	125	0	2	1	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.968		
Satd. Flow (prot)	1863	0	0	1383	1611	0
Flt Permitted				0.968		
Satd. Flow (perm)	1863	0	0	1383	1611	0
Link Speed (mph)	25			25	25	
Link Distance (ft)	240			236	303	
Travel Time (s)	6.5			6.4	8.3	
Peak Hour Factor	0.76	0.92	0.25	0.25	0.92	0.25
Heavy Vehicles (%)	2%	2%	33%	33%	2%	2%
Adj. Flow (vph)	164	0	8	4	0	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	164	0	0	12	4	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 16.6%		ICU Level of Service A	
Analysis Period (min) 15			

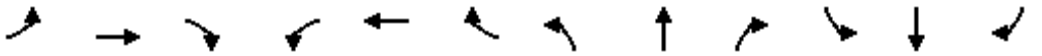
Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	125	0	2	1	0	1
Future Vol, veh/h	125	0	2	1	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	76	92	25	25	92	25
Heavy Vehicles, %	2	2	33	33	2	2
Mvmt Flow	164	0	8	4	0	4

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	164	0	184	164
Stage 1	-	-	-	-	164	-
Stage 2	-	-	-	-	20	-
Critical Hdwy	-	-	4.43	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.497	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1247	-	805	881
Stage 1	-	-	-	-	865	-
Stage 2	-	-	-	-	1003	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1247	-	800	881
Mov Cap-2 Maneuver	-	-	-	-	800	-
Stage 1	-	-	-	-	860	-
Stage 2	-	-	-	-	1003	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.3	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	881	-	-	1247	-
HCM Lane V/C Ratio	0.005	-	-	0.006	-
HCM Control Delay (s)	9.1	-	-	7.9	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

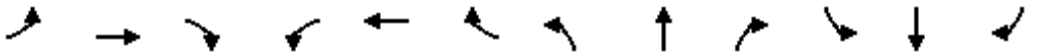


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	38	50	10	12	0	125	64	41	3	133	82
Future Volume (vph)	20	38	50	10	12	0	125	64	41	3	133	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		60	0		45	210		0	85		10
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850						0.850			0.850
Flt Protected		0.978			0.978		0.950			0.950		
Satd. Flow (prot)	0	1705	1482	0	1770	1810	1719	1810	1538	1752	1845	1568
Flt Permitted		0.833			0.812		0.503			0.700		
Satd. Flow (perm)	0	1452	1482	0	1469	1810	910	1810	1538	1291	1845	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			208						208			208
Link Speed (mph)		45			40			45			45	
Link Distance (ft)		899			591			864			643	
Travel Time (s)		13.6			10.1			13.1			9.7	
Peak Hour Factor	0.50	0.79	0.57	0.50	0.50	0.92	0.46	0.73	0.64	0.75	0.79	0.59
Heavy Vehicles (%)	9%	9%	9%	5%	5%	5%	5%	5%	5%	3%	3%	3%
Adj. Flow (vph)	40	48	88	20	24	0	272	88	64	4	168	139
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	88	88	0	44	0	272	88	64	4	168	139
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Free	Perm	NA	Free	pm+pt	NA	Free	pm+pt	NA	Free
Protected Phases		4			8		5	2		1	6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		Free	8		Free	2		Free	6		Free
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		9.5	23.0		9.5	23.0	
Total Split (%)	40.9%	40.9%		40.9%	40.9%		17.3%	41.8%		17.3%	41.8%	
Maximum Green (s)	18.0	18.0		18.0	18.0		5.0	18.5		5.0	18.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0			11.0	
Pedestrian Calls (#/hr)	0	0		0	0			0			0	
Act Effct Green (s)		7.6	33.2		7.5		20.7	22.2	33.2	16.6	11.3	33.2
Actuated g/C Ratio		0.23	1.00		0.23		0.62	0.67	1.00	0.50	0.34	1.00
v/c Ratio		0.27	0.06		0.13		0.39	0.07	0.04	0.01	0.27	0.09
Control Delay		13.7	0.1		12.4		6.9	7.1	0.0	4.7	11.7	0.1
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		13.7	0.1		12.4		6.9	7.1	0.0	4.7	11.7	0.1
LOS		B	A		B		A	A	A	A	B	A
Approach Delay		6.9			12.4			5.9			6.4	
Approach LOS		A			B			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 55			
Actuated Cycle Length: 33.2			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.39			
Intersection Signal Delay: 6.6		Intersection LOS: A	
Intersection Capacity Utilization 34.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 24: Dollarway Rd & Hoadley Rd



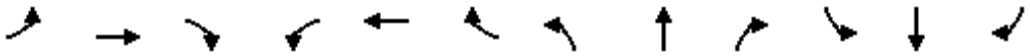
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	38	50	10	12	0	125	64	41	3	133	82
Future Volume (veh/h)	20	38	50	10	12	0	125	64	41	3	133	82
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1767	1767	1826	1826	1826	1826	1826	1826	1856	1856	1856
Adj Flow Rate, veh/h	40	48	0	20	24	0	272	88	0	4	168	0
Peak Hour Factor	0.50	0.79	0.57	0.50	0.50	0.92	0.46	0.73	0.64	0.75	0.79	0.59
Percent Heavy Veh, %	9	9	9	5	5	5	5	5	5	3	3	3
Cap, veh/h	283	105		277	122		702	646		539	359	
Arrive On Green	0.12	0.12	0.00	0.12	0.12	0.00	0.17	0.35	0.00	0.01	0.19	0.00
Sat Flow, veh/h	676	889	1497	631	1031	1547	1739	1826	1547	1767	1856	1572
Grp Volume(v), veh/h	88	0	0	44	0	0	272	88	0	4	168	0
Grp Sat Flow(s),veh/h/ln	1564	0	1497	1662	0	1547	1739	1826	1547	1767	1856	1572
Q Serve(g_s), s	0.7	0.0	0.0	0.0	0.0	0.0	2.8	0.8	0.0	0.0	2.1	0.0
Cycle Q Clear(g_c), s	1.3	0.0	0.0	0.6	0.0	0.0	2.8	0.8	0.0	0.0	2.1	0.0
Prop In Lane	0.45		1.00	0.45		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	388	0		399	0		702	646		539	359	
V/C Ratio(X)	0.23	0.00		0.11	0.00		0.39	0.14		0.01	0.47	
Avail Cap(c_a), veh/h	1269	0		1300	0		749	1307		871	1328	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	10.6	0.0	0.0	10.3	0.0	0.0	5.4	5.7	0.0	8.3	9.2	0.0
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.1	0.0	0.0	0.4	0.1	0.0	0.0	1.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	0.1	0.0	0.0	0.2	0.1	0.0	0.0	0.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.9	0.0	0.0	10.4	0.0	0.0	5.8	5.8	0.0	8.3	10.2	0.0
LnGrp LOS	B	A		B	A		A	A		A	B	
Approach Vol, veh/h		88	A		44	A		360	A		172	A
Approach Delay, s/veh		10.9			10.4			5.8			10.2	
Approach LOS		B			B			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.6	13.6		7.6	8.8	9.5		7.6				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	18.5		18.0	5.0	18.5		18.0				
Max Q Clear Time (g_c+I1), s	2.0	2.8		3.3	4.8	4.1		2.6				
Green Ext Time (p_c), s	0.0	0.3		0.3	0.0	0.6		0.1				

Intersection Summary		
HCM 6th Ctrl Delay	7.9	
HCM 6th LOS	A	

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	68	62	11	0	6	2	7	7	16	16	10
Future Volume (vph)	47	68	62	11	0	6	2	7	7	16	16	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		190	0		0	0		0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.953				0.850		0.940			0.967	
Flt Protected		0.987			0.950			0.994			0.981	
Satd. Flow (prot)	0	1752	0	0	1770	1583	0	1675	0	0	1767	0
Flt Permitted		0.987			0.950			0.994			0.981	
Satd. Flow (perm)	0	1752	0	0	1770	1583	0	1675	0	0	1767	0
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		303			594			422			385	
Travel Time (s)		5.9			11.6			7.2			6.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	6%	6%	6%	2%	2%	2%
Adj. Flow (vph)	51	74	67	12	0	7	2	8	8	17	17	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	192	0	0	12	7	0	18	0	0	45	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 28.7%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	8.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	47	68	62	11	0	6	2	7	7	16	16	10
Future Vol, veh/h	47	68	62	11	0	6	2	7	7	16	16	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	190	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	6	6	6	2	2	2
Mvmt Flow	51	74	67	12	0	7	2	8	8	17	17	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	77	77	23	143	78	12	28	0	0	16	0	0
Stage 1	57	57	-	16	16	-	-	-	-	-	-	-
Stage 2	20	20	-	127	62	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.16	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.254	-	-	2.218	-	-
Pot Cap-1 Maneuver	912	813	1054	826	812	1069	1560	-	-	1602	-	-
Stage 1	955	847	-	1004	882	-	-	-	-	-	-	-
Stage 2	999	879	-	877	843	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	898	803	1054	712	802	1069	1560	-	-	1602	-	-
Mov Cap-2 Maneuver	898	803	-	712	802	-	-	-	-	-	-	-
Stage 1	954	838	-	1003	881	-	-	-	-	-	-	-
Stage 2	992	878	-	740	834	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.1	9.5	0.9	2.8
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1560	-	-	904	712	1069	1602	-	-
HCM Lane V/C Ratio	0.001	-	-	0.213	0.017	0.006	0.011	-	-
HCM Control Delay (s)	7.3	0	-	10.1	10.1	8.4	7.3	0	-
HCM Lane LOS	A	A	-	B	B	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.8	0.1	0	0	-	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	10	10	31	91	161	77
Future Volume (vph)	10	10	31	91	161	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125	0		0	0	
Storage Lanes	1	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.900			
Flt Protected	0.950					0.967
Satd. Flow (prot)	1770	1583	1660	0	0	1801
Flt Permitted	0.950					0.967
Satd. Flow (perm)	1770	1583	1660	0	0	1801
Link Speed (mph)	25		55			55
Link Distance (ft)	263		258			236
Travel Time (s)	7.2		3.2			2.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	3%	3%	2%	2%
Adj. Flow (vph)	11	11	34	99	175	84
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	11	133	0	0	259
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 33.5%		ICU Level of Service A	
Analysis Period (min) 15			

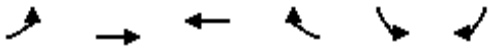
Intersection	
Int Delay, s/veh	3.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	10	31	91	161	77
Future Vol, veh/h	10	10	31	91	161	77
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	3	3	2	2
Mvmt Flow	11	11	34	99	175	84

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	518	84	0	0	133	0
Stage 1	84	-	-	-	-	-
Stage 2	434	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	518	975	-	-	1452	-
Stage 1	939	-	-	-	-	-
Stage 2	653	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	453	975	-	-	1452	-
Mov Cap-2 Maneuver	453	-	-	-	-	-
Stage 1	821	-	-	-	-	-
Stage 2	653	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.9	0	5.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	453	975	1452	-
HCM Lane V/C Ratio	-	-	0.024	0.011	0.121	-
HCM Control Delay (s)	-	-	13.1	8.7	7.8	0
HCM Lane LOS	-	-	B	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	0.4	-



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	184	60	14	2	1	0
Future Volume (vph)	184	60	14	2	1	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.984			
Flt Protected		0.964			0.950	
Satd. Flow (prot)	0	1796	1833	0	1770	0
Flt Permitted		0.964			0.950	
Satd. Flow (perm)	0	1796	1833	0	1770	0
Link Speed (mph)		25	25		25	
Link Distance (ft)		267	203		489	
Travel Time (s)		7.3	5.5		13.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	200	65	15	2	1	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	265	17	0	1	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 30.0%		ICU Level of Service A	
Analysis Period (min) 15			

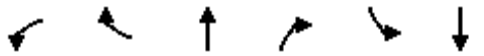
Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	184	60	14	2	1	0
Future Vol, veh/h	184	60	14	2	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	200	65	15	2	1	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	17	0	-	0	481	16
Stage 1	-	-	-	-	16	-
Stage 2	-	-	-	-	465	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1600	-	-	-	544	1063
Stage 1	-	-	-	-	1007	-
Stage 2	-	-	-	-	632	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1600	-	-	-	473	1063
Mov Cap-2 Maneuver	-	-	-	-	473	-
Stage 1	-	-	-	-	876	-
Stage 2	-	-	-	-	632	-

Approach	EB	WB	SB
HCM Control Delay, s	5.7	0	12.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1600	-	-	-	473
HCM Lane V/C Ratio	0.125	-	-	-	0.002
HCM Control Delay (s)	7.6	0	-	-	12.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.4	-	-	-	0



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	36	0	0	129
Future Volume (vph)	0	0	36	0	0	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1473	0	1845	0	0	1863
Flt Permitted						
Satd. Flow (perm)	1473	0	1845	0	0	1863
Link Speed (mph)	25		45			45
Link Distance (ft)	271		279			285
Travel Time (s)	7.4		4.2			4.3
Peak Hour Factor	0.50	0.25	0.75	0.79	0.74	0.85
Heavy Vehicles (%)	29%	29%	3%	3%	2%	2%
Adj. Flow (vph)	0	0	48	0	0	152
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	48	0	0	152
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 10.1%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	36	0	0	129
Future Vol, veh/h	0	0	36	0	0	129
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	50	25	75	79	74	85
Heavy Vehicles, %	29	29	3	3	2	2
Mvmt Flow	0	0	48	0	0	152

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	200	48	0	0	48	0
Stage 1	48	-	-	-	-	-
Stage 2	152	-	-	-	-	-
Critical Hdwy	6.69	6.49	-	-	4.12	-
Critical Hdwy Stg 1	5.69	-	-	-	-	-
Critical Hdwy Stg 2	5.69	-	-	-	-	-
Follow-up Hdwy	3.761	3.561	-	-	2.218	-
Pot Cap-1 Maneuver	731	949	-	-	1559	-
Stage 1	910	-	-	-	-	-
Stage 2	814	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	731	949	-	-	1559	-
Mov Cap-2 Maneuver	731	-	-	-	-	-
Stage 1	910	-	-	-	-	-
Stage 2	814	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	1559	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	-	-	0	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	0	0	2	1	0	1
Future Volume (vph)	0	0	2	1	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.968		
Satd. Flow (prot)	1863	0	0	1383	1611	0
Flt Permitted				0.968		
Satd. Flow (perm)	1863	0	0	1383	1611	0
Link Speed (mph)	25			25	25	
Link Distance (ft)	240			236	303	
Travel Time (s)	6.5			6.4	8.3	
Peak Hour Factor	0.76	0.92	0.25	0.25	0.92	0.25
Heavy Vehicles (%)	2%	2%	33%	33%	2%	2%
Adj. Flow (vph)	0	0	8	4	0	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	12	4	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			

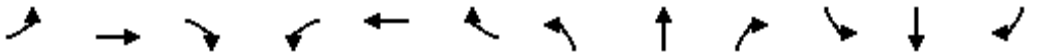
Intersection	
Int Delay, s/veh	5.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	0	0	2	1	0	1
Future Vol, veh/h	0	0	2	1	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	76	92	25	25	92	25
Heavy Vehicles, %	2	2	33	33	2	2
Mvmt Flow	0	0	8	4	0	4

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1	0	21	1
Stage 1	-	-	-	-	1	-
Stage 2	-	-	-	-	20	-
Critical Hdwy	-	-	4.43	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.497	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1440	-	996	1084
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	1003	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1440	-	990	1084
Mov Cap-2 Maneuver	-	-	-	-	990	-
Stage 1	-	-	-	-	1016	-
Stage 2	-	-	-	-	1003	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5	8.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1084	-	-	1440	-
HCM Lane V/C Ratio	0.004	-	-	0.006	-
HCM Control Delay (s)	8.3	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-



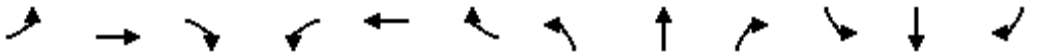
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	38	50	10	12	0	125	64	41	3	133	82
Future Volume (vph)	20	38	50	10	12	0	125	64	41	3	133	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		60	0		45	210		0	85		10
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850						0.850			0.850
Flt Protected		0.983			0.978		0.950			0.950		
Satd. Flow (prot)	0	1713	1482	0	1770	1810	1719	1810	1538	1752	1845	1568
Flt Permitted							0.628			0.711		
Satd. Flow (perm)	0	1743	1482	0	1810	1810	1136	1810	1538	1312	1845	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			208						208			208
Link Speed (mph)		45			40			45			45	
Link Distance (ft)		899			591			864			643	
Travel Time (s)		13.6			10.1			13.1			9.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	5%	5%	5%	5%	5%	5%	3%	3%	3%
Adj. Flow (vph)	22	41	54	11	13	0	136	70	45	3	145	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	63	54	0	24	0	136	70	45	3	145	89
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Free	Perm	NA	Free	pm+pt	NA	Free	pm+pt	NA	Free
Protected Phases		4			8		5	2		1	6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		Free	8		Free	2		Free	6		Free
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		10.0	23.0		9.5	22.5	
Total Split (%)	40.9%	40.9%		40.9%	40.9%		18.2%	41.8%		17.3%	40.9%	
Maximum Green (s)	18.0	18.0		18.0	18.0		5.5	18.5		5.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0			11.0	
Pedestrian Calls (#/hr)	0	0		0	0			0			0	
Act Effct Green (s)		7.2	28.3		6.9		18.9	21.7	28.3	18.0	20.0	28.3
Actuated g/C Ratio		0.25	1.00		0.24		0.67	0.77	1.00	0.64	0.71	1.00
v/c Ratio		0.14	0.04		0.05		0.15	0.05	0.03	0.00	0.11	0.06
Control Delay		11.0	0.0		10.7		3.9	6.1	0.0	4.0	8.1	0.1
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		11.0	0.0		10.7		3.9	6.1	0.0	4.0	8.1	0.1
LOS		B	A		B		A	A	A	A	A	A
Approach Delay		6.0			10.7			3.8			5.0	
Approach LOS		A			B			A			A	

Intersection Summary

Area Type: Other
Cycle Length: 55
Actuated Cycle Length: 28.3
Natural Cycle: 55
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.15
Intersection Signal Delay: 4.9 Intersection LOS: A
Intersection Capacity Utilization 34.9% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 24: Dollarway Rd & Hoadley Rd



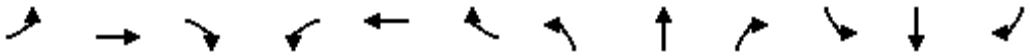
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	38	50	10	12	0	125	64	41	3	133	82
Future Volume (veh/h)	20	38	50	10	12	0	125	64	41	3	133	82
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1767	1767	1826	1826	1826	1826	1826	1826	1856	1856	1856
Adj Flow Rate, veh/h	22	41	0	11	13	0	136	70	0	3	145	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	9	9	9	5	5	5	5	5	5	3	3	3
Cap, veh/h	257	96		292	82		698	607		592	393	
Arrive On Green	0.09	0.09	0.00	0.09	0.09	0.00	0.12	0.33	0.00	0.00	0.21	0.00
Sat Flow, veh/h	560	1043	1497	756	894	1547	1739	1826	1547	1767	1856	1572
Grp Volume(v), veh/h	63	0	0	24	0	0	136	70	0	3	145	0
Grp Sat Flow(s),veh/h/ln	1602	0	1497	1650	0	1547	1739	1826	1547	1767	1856	1572
Q Serve(g_s), s	0.6	0.0	0.0	0.0	0.0	0.0	1.3	0.6	0.0	0.0	1.6	0.0
Cycle Q Clear(g_c), s	0.9	0.0	0.0	0.3	0.0	0.0	1.3	0.6	0.0	0.0	1.6	0.0
Prop In Lane	0.35		1.00	0.46		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	353	0		374	0		698	607		592	393	
V/C Ratio(X)	0.18	0.00		0.06	0.00		0.19	0.12		0.01	0.37	
Avail Cap(c_a), veh/h	1412	0		1420	0		885	1430		958	1414	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	10.1	0.0	0.0	9.9	0.0	0.0	5.5	5.5	0.0	7.3	8.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.4	0.0	0.0	9.9	0.0	0.0	5.6	5.6	0.0	7.3	8.5	0.0
LnGrp LOS	B	A		A	A		A	A		A	A	
Approach Vol, veh/h		63	A		24	A		206	A		148	A
Approach Delay, s/veh		10.4			9.9			5.6			8.5	
Approach LOS		B			A			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.6	12.4		6.7	7.5	9.5		6.7				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	18.5		18.0	5.5	18.0		18.0				
Max Q Clear Time (g_c+I1), s	2.0	2.6		2.9	3.3	3.6		2.3				
Green Ext Time (p_c), s	0.0	0.2		0.2	0.1	0.5		0.0				

Intersection Summary			
HCM 6th Ctrl Delay		7.5	
HCM 6th LOS		A	

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	291	68	62	11	0	6	2	7	7	16	16	24
Future Volume (vph)	291	68	62	11	0	6	2	7	7	16	16	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		190	0		0	0		0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.980				0.850		0.940			0.941	
Flt Protected		0.967			0.950			0.994			0.986	
Satd. Flow (prot)	0	1765	0	0	1770	1583	0	1675	0	0	1728	0
Flt Permitted		0.967			0.950			0.994			0.986	
Satd. Flow (perm)	0	1765	0	0	1770	1583	0	1675	0	0	1728	0
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		303			594			422			385	
Travel Time (s)		5.9			11.6			7.2			6.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	6%	6%	6%	2%	2%	2%
Adj. Flow (vph)	316	74	67	12	0	7	2	8	8	17	17	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	457	0	0	12	7	0	18	0	0	60	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 42.9%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	11.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	291	68	62	11	0	6	2	7	7	16	16	24
Future Vol, veh/h	291	68	62	11	0	6	2	7	7	16	16	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	190	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	6	6	6	2	2	2
Mvmt Flow	316	74	67	12	0	7	2	8	8	17	17	26

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	84	84	30	151	93	12	43	0	0	16	0	0
Stage 1	64	64	-	16	16	-	-	-	-	-	-	-
Stage 2	20	20	-	135	77	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.16	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.254	-	-	2.218	-	-
Pot Cap-1 Maneuver	903	806	1044	816	797	1069	1540	-	-	1602	-	-
Stage 1	947	842	-	1004	882	-	-	-	-	-	-	-
Stage 2	999	879	-	868	831	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	889	796	1044	703	787	1069	1540	-	-	1602	-	-
Mov Cap-2 Maneuver	889	796	-	703	787	-	-	-	-	-	-	-
Stage 1	946	833	-	1003	881	-	-	-	-	-	-	-
Stage 2	992	878	-	732	822	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.2	9.6	0.9	2.1
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1540	-	-	892	703	1069	1602	-	-
HCM Lane V/C Ratio	0.001	-	-	0.513	0.017	0.006	0.011	-	-
HCM Control Delay (s)	7.3	0	-	13.2	10.2	8.4	7.3	0	-
HCM Lane LOS	A	A	-	B	B	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	3	0.1	0	0	-	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	32	10	31	173	161	77
Future Volume (vph)	32	10	31	173	161	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125	0		0	0	
Storage Lanes	1	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.886			
Flt Protected	0.950					0.967
Satd. Flow (prot)	1770	1583	1634	0	0	1801
Flt Permitted	0.950					0.967
Satd. Flow (perm)	1770	1583	1634	0	0	1801
Link Speed (mph)	25		55			55
Link Distance (ft)	263		258			236
Travel Time (s)	7.2		3.2			2.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	3%	3%	2%	2%
Adj. Flow (vph)	35	11	34	188	175	84
Shared Lane Traffic (%)						
Lane Group Flow (vph)	35	11	222	0	0	259
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 38.6%		ICU Level of Service A	
Analysis Period (min) 15			

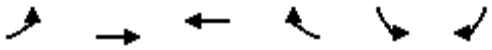
Intersection	
Int Delay, s/veh	3.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	32	10	31	173	161	77
Future Vol, veh/h	32	10	31	173	161	77
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	3	3	2	2
Mvmt Flow	35	11	34	188	175	84

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	562	128	0	0	222	0
Stage 1	128	-	-	-	-	-
Stage 2	434	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	488	922	-	-	1347	-
Stage 1	898	-	-	-	-	-
Stage 2	653	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	422	922	-	-	1347	-
Mov Cap-2 Maneuver	422	-	-	-	-	-
Stage 1	776	-	-	-	-	-
Stage 2	653	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13	0	5.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	422	922	1347	-
HCM Lane V/C Ratio	-	-	0.082	0.012	0.13	-
HCM Control Delay (s)	-	-	14.3	9	8.1	0
HCM Lane LOS	-	-	B	A	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0	0.4	-



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	184	237	26	2	1	0
Future Volume (vph)	184	237	26	2	1	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.991			
Flt Protected		0.979			0.950	
Satd. Flow (prot)	0	1824	1846	0	1770	0
Flt Permitted		0.979			0.950	
Satd. Flow (perm)	0	1824	1846	0	1770	0
Link Speed (mph)		25	25		25	
Link Distance (ft)		267	203		489	
Travel Time (s)		7.3	5.5		13.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	200	258	28	2	1	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	458	30	0	1	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 39.3%		ICU Level of Service A	
Analysis Period (min) 15			

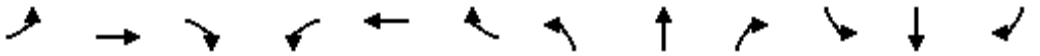
Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	184	237	26	2	1	0
Future Vol, veh/h	184	237	26	2	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	200	258	28	2	1	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	30	0	-	0	687	29
Stage 1	-	-	-	-	29	-
Stage 2	-	-	-	-	658	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1583	-	-	-	413	1046
Stage 1	-	-	-	-	994	-
Stage 2	-	-	-	-	515	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1583	-	-	-	352	1046
Mov Cap-2 Maneuver	-	-	-	-	352	-
Stage 1	-	-	-	-	848	-
Stage 2	-	-	-	-	515	-

Approach	EB	WB	SB
HCM Control Delay, s	3.3	0	15.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1583	-	-	-	352
HCM Lane V/C Ratio	0.126	-	-	-	0.003
HCM Control Delay (s)	7.6	0	-	-	15.3
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.4	-	-	-	0



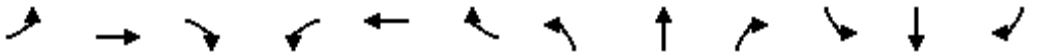
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	38	50	10	12	20	125	64	41	255	133	82
Future Volume (vph)	20	38	50	10	12	20	125	64	41	255	133	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		60	0		45	210		0	85		10
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.983			0.978		0.950			0.950		
Satd. Flow (prot)	0	1713	1482	0	1770	1538	1719	1810	1538	1752	1845	1568
Flt Permitted							0.665			0.531		
Satd. Flow (perm)	0	1743	1482	0	1810	1538	1203	1810	1538	980	1845	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			208			208			208			208
Link Speed (mph)		45			40			45			45	
Link Distance (ft)		899			591			864			643	
Travel Time (s)		13.6			10.1			13.1			9.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	5%	5%	5%	5%	5%	5%	3%	3%	3%
Adj. Flow (vph)	22	41	54	11	13	22	136	70	45	277	145	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	63	54	0	24	22	136	70	45	277	145	89
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Free	Perm	NA	Free	pm+pt	NA	Free	pm+pt	NA	Free
Protected Phases		4			8		5	2		1	6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		Free	8		Free	2		Free	6		Free
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		9.5	22.5		10.0	23.0	
Total Split (%)	40.9%	40.9%		40.9%	40.9%		17.3%	40.9%		18.2%	41.8%	
Maximum Green (s)	18.0	18.0		18.0	18.0		5.0	18.0		5.5	18.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0			11.0	
Pedestrian Calls (#/hr)	0	0		0	0			0			0	
Act Effct Green (s)		7.0	28.8		6.7	28.8	14.7	9.3	28.8	18.7	20.4	28.8
Actuated g/C Ratio		0.24	1.00		0.23	1.00	0.51	0.32	1.00	0.65	0.71	1.00
v/c Ratio		0.15	0.04		0.06	0.01	0.19	0.12	0.03	0.35	0.11	0.06
Control Delay		11.1	0.0		10.9	0.0	4.5	9.9	0.0	5.1	7.9	0.1
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		11.1	0.0		10.9	0.0	4.5	9.9	0.0	5.1	7.9	0.1
LOS		B	A		B	A	A	A	A	A	A	A
Approach Delay		6.0			5.7			5.2			5.0	
Approach LOS		A			A			A			A	

Intersection Summary

Area Type: Other
Cycle Length: 55
Actuated Cycle Length: 28.8
Natural Cycle: 55
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.35
Intersection Signal Delay: 5.2 Intersection LOS: A
Intersection Capacity Utilization 39.3% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 24: Dollarway Rd & Hoadley Rd



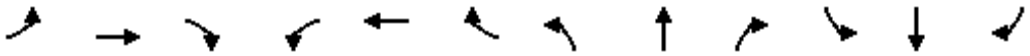
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	38	50	10	12	20	125	64	41	255	133	82
Future Volume (veh/h)	20	38	50	10	12	20	125	64	41	255	133	82
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1767	1767	1826	1826	1826	1826	1826	1826	1856	1856	1856
Adj Flow Rate, veh/h	22	41	0	11	13	0	136	70	0	277	145	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	9	9	9	5	5	5	5	5	5	3	3	3
Cap, veh/h	245	95		278	81		724	365		810	460	
Arrive On Green	0.09	0.09	0.00	0.09	0.09	0.00	0.12	0.20	0.00	0.17	0.25	0.00
Sat Flow, veh/h	560	1043	1497	757	895	1547	1739	1826	1547	1767	1856	1572
Grp Volume(v), veh/h	63	0	0	24	0	0	136	70	0	277	145	0
Grp Sat Flow(s),veh/h/ln	1603	0	1497	1651	0	1547	1739	1826	1547	1767	1856	1572
Q Serve(g_s), s	0.6	0.0	0.0	0.0	0.0	0.0	1.4	0.8	0.0	2.9	1.6	0.0
Cycle Q Clear(g_c), s	0.9	0.0	0.0	0.3	0.0	0.0	1.4	0.8	0.0	2.9	1.6	0.0
Prop In Lane	0.35		1.00	0.46		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	339	0		359	0		724	365		810	460	
V/C Ratio(X)	0.19	0.00		0.07	0.00		0.19	0.19		0.34	0.31	
Avail Cap(c_a), veh/h	1333	0		1340	0		858	1312		897	1371	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	10.8	0.0	0.0	10.5	0.0	0.0	6.3	8.3	0.0	5.9	7.7	0.0
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.1	0.0	0.0	0.1	0.3	0.0	0.2	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.1	0.0	0.0	0.2	0.2	0.0	0.3	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.0	0.0	0.0	10.6	0.0	0.0	6.4	8.6	0.0	6.2	8.1	0.0
LnGrp LOS	B	A		B	A		A	A		A	A	
Approach Vol, veh/h		63	A		24	A		206	A		422	A
Approach Delay, s/veh		11.0			10.6			7.1			6.8	
Approach LOS		B			B			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.8	9.5		6.8	7.6	10.7		6.8				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.5	18.0		18.0	5.0	18.5		18.0				
Max Q Clear Time (g_c+I1), s	4.9	2.8		2.9	3.4	3.6		2.3				
Green Ext Time (p_c), s	0.1	0.2		0.2	0.0	0.5		0.0				

Intersection Summary			
HCM 6th Ctrl Delay		7.4	
HCM 6th LOS		A	

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	25	32	17	7	13	18	21	8	15	16	13
Future Volume (vph)	36	25	32	17	7	13	18	21	8	15	16	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		190	0		0	0		0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.948				0.850		0.981			0.952	
Flt Protected		0.986			0.968			0.981			0.983	
Satd. Flow (prot)	0	1741	0	0	1803	1583	0	1758	0	0	1631	0
Flt Permitted		0.986			0.968			0.981			0.983	
Satd. Flow (perm)	0	1741	0	0	1803	1583	0	1758	0	0	1631	0
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		303			594			422			385	
Travel Time (s)		5.9			11.6			7.2			6.6	
Peak Hour Factor	0.90	0.57	0.62	0.71	0.58	0.46	0.56	0.53	0.67	0.63	0.80	0.54
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	9%	9%	9%
Adj. Flow (vph)	40	44	52	24	12	28	32	40	12	24	20	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	136	0	0	36	28	0	84	0	0	68	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 22.1%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	36	25	32	17	7	13	18	21	8	15	16	13
Future Vol, veh/h	36	25	32	17	7	13	18	21	8	15	16	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	190	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	57	62	71	58	46	56	53	67	63	80	54
Heavy Vehicles, %	2	2	2	2	2	2	4	4	4	9	9	9
Mvmt Flow	40	44	52	24	12	28	32	40	12	24	20	24

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	210	196	32	238	202	46	44	0	0	52	0	0
Stage 1	80	80	-	110	110	-	-	-	-	-	-	-
Stage 2	130	116	-	128	92	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.14	-	-	4.19	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.236	-	-	2.281	-	-
Pot Cap-1 Maneuver	747	699	1042	716	694	1023	1552	-	-	1510	-	-
Stage 1	929	828	-	895	804	-	-	-	-	-	-	-
Stage 2	874	800	-	876	819	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	696	673	1042	629	668	1023	1552	-	-	1510	-	-
Mov Cap-2 Maneuver	696	673	-	629	668	-	-	-	-	-	-	-
Stage 1	909	815	-	876	787	-	-	-	-	-	-	-
Stage 2	819	783	-	775	806	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.5	9.9	2.8	2.6
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1552	-	-	787	642	1023	1510	-	-
HCM Lane V/C Ratio	0.021	-	-	0.172	0.056	0.028	0.016	-	-
HCM Control Delay (s)	7.4	0	-	10.5	10.9	8.6	7.4	0	-
HCM Lane LOS	A	A	-	B	B	A	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.6	0.2	0.1	0	-	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	52	7	83	32	6	93
Future Volume (vph)	52	7	83	32	6	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125	0		0	0	
Storage Lanes	1	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.955			
Flt Protected	0.950					0.996
Satd. Flow (prot)	1752	1568	1779	0	0	1785
Flt Permitted	0.950					0.996
Satd. Flow (perm)	1752	1568	1779	0	0	1785
Link Speed (mph)	25		55			55
Link Distance (ft)	263		258			236
Travel Time (s)	7.2		3.2			2.9
Peak Hour Factor	0.50	0.58	0.74	0.57	0.50	0.75
Heavy Vehicles (%)	3%	3%	2%	2%	6%	6%
Adj. Flow (vph)	104	12	112	56	12	124
Shared Lane Traffic (%)						
Lane Group Flow (vph)	104	12	168	0	0	136
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 19.8%		ICU Level of Service A	
Analysis Period (min) 15			

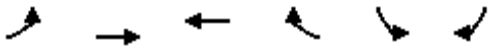
Intersection	
Int Delay, s/veh	3.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	52	7	83	32	6	93
Future Vol, veh/h	52	7	83	32	6	93
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	50	58	74	57	50	75
Heavy Vehicles, %	3	3	2	2	6	6
Mvmt Flow	104	12	112	56	12	124

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	288	140	0	0	168	0
Stage 1	140	-	-	-	-	-
Stage 2	148	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.16	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.254	-
Pot Cap-1 Maneuver	700	905	-	-	1386	-
Stage 1	884	-	-	-	-	-
Stage 2	877	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	694	905	-	-	1386	-
Mov Cap-2 Maneuver	694	-	-	-	-	-
Stage 1	876	-	-	-	-	-
Stage 2	877	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.9	0	0.7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	694	905	1386	-
HCM Lane V/C Ratio	-	-	0.15	0.013	0.009	-
HCM Control Delay (s)	-	-	11.1	9	7.6	0
HCM Lane LOS	-	-	B	A	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0	0	-



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	18	13	22	1	2	32
Future Volume (vph)	18	13	22	1	2	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.983		0.871	
Flt Protected		0.969			0.998	
Satd. Flow (prot)	0	1787	1796	0	1619	0
Flt Permitted		0.969			0.998	
Satd. Flow (perm)	0	1787	1796	0	1619	0
Link Speed (mph)		25	25		25	
Link Distance (ft)		267	203		489	
Travel Time (s)		7.3	5.5		13.3	
Peak Hour Factor	0.50	0.65	0.79	0.25	0.50	0.40
Heavy Vehicles (%)	3%	3%	4%	4%	2%	2%
Adj. Flow (vph)	36	20	28	4	4	80
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	56	32	0	84	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 18.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	5.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	18	13	22	1	2	32
Future Vol, veh/h	18	13	22	1	2	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	50	65	79	25	50	40
Heavy Vehicles, %	3	3	4	4	2	2
Mvmt Flow	36	20	28	4	4	80

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	32	0	-	0	122	30
Stage 1	-	-	-	-	30	-
Stage 2	-	-	-	-	92	-
Critical Hdwy	4.13	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.227	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1574	-	-	-	873	1044
Stage 1	-	-	-	-	993	-
Stage 2	-	-	-	-	932	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1574	-	-	-	853	1044
Mov Cap-2 Maneuver	-	-	-	-	853	-
Stage 1	-	-	-	-	970	-
Stage 2	-	-	-	-	932	-

Approach	EB	WB	SB
HCM Control Delay, s	4.7	0	8.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1574	-	-	-	1033
HCM Lane V/C Ratio	0.023	-	-	-	0.081
HCM Control Delay (s)	7.3	0	-	-	8.8
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	22	13	54	18	2	78
Future Volume (vph)	22	13	54	18	2	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.947		0.959			
Flt Protected	0.970					0.998
Satd. Flow (prot)	1711	0	1786	0	0	1724
Flt Permitted	0.970					0.998
Satd. Flow (perm)	1711	0	1786	0	0	1724
Link Speed (mph)	25		45			45
Link Distance (ft)	271		279			285
Travel Time (s)	7.4		4.2			4.3
Peak Hour Factor	0.50	0.46	0.84	0.64	0.50	0.89
Heavy Vehicles (%)	2%	2%	2%	2%	10%	10%
Adj. Flow (vph)	44	28	64	28	4	88
Shared Lane Traffic (%)						
Lane Group Flow (vph)	72	0	92	0	0	92
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 15.7%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	2.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	22	13	54	18	2	78
Future Vol, veh/h	22	13	54	18	2	78
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	50	46	84	64	50	89
Heavy Vehicles, %	2	2	2	2	10	10
Mvmt Flow	44	28	64	28	4	88

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	174	78	0	0	92	0
Stage 1	78	-	-	-	-	-
Stage 2	96	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.2	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.29	-
Pot Cap-1 Maneuver	816	983	-	-	1454	-
Stage 1	945	-	-	-	-	-
Stage 2	928	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	814	983	-	-	1454	-
Mov Cap-2 Maneuver	814	-	-	-	-	-
Stage 1	942	-	-	-	-	-
Stage 2	928	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.5	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	873	1454	-
HCM Lane V/C Ratio	-	-	0.083	0.003	-
HCM Control Delay (s)	-	-	9.5	7.5	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	15	0	1	26	0	0
Future Volume (vph)	15	0	1	26	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected				0.997		
Satd. Flow (prot)	1863	0	0	1821	1863	0
Flt Permitted				0.997		
Satd. Flow (perm)	1863	0	0	1821	1863	0
Link Speed (mph)	25			25	25	
Link Distance (ft)	240			236	303	
Travel Time (s)	6.5			6.4	8.3	
Peak Hour Factor	0.63	0.92	0.25	0.46	0.92	0.92
Heavy Vehicles (%)	2%	2%	4%	4%	2%	2%
Adj. Flow (vph)	24	0	4	57	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	24	0	0	61	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 6.7%		ICU Level of Service A	
Analysis Period (min) 15			

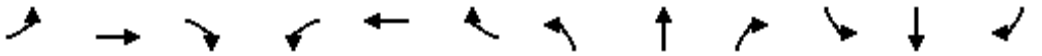
Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	15	0	1	26	0	0
Future Vol, veh/h	15	0	1	26	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	63	92	25	46	92	92
Heavy Vehicles, %	2	2	4	4	2	2
Mvmt Flow	24	0	4	57	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	24	0	89	24
Stage 1	-	-	-	-	24	-
Stage 2	-	-	-	-	65	-
Critical Hdwy	-	-	4.14	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.236	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1578	-	912	1052
Stage 1	-	-	-	-	999	-
Stage 2	-	-	-	-	958	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1578	-	909	1052
Mov Cap-2 Maneuver	-	-	-	-	909	-
Stage 1	-	-	-	-	996	-
Stage 2	-	-	-	-	958	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1578	-
HCM Lane V/C Ratio	-	-	-	0.003	-
HCM Control Delay (s)	0	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	-	-	-	0	-



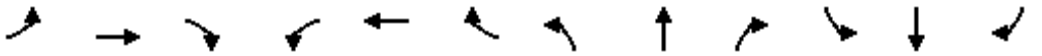
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	24	39	83	31	1	49	122	60	0	125	33
Future Volume (vph)	32	24	39	83	31	1	49	122	60	0	125	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		60	0		45	210		0	85		10
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.971			0.967		0.950					
Satd. Flow (prot)	0	1724	1509	0	1801	1583	1719	1810	1538	1792	1792	1524
Flt Permitted		0.720			0.743		0.493					
Satd. Flow (perm)	0	1279	1509	0	1384	1583	892	1810	1538	1792	1792	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			208			208			208			208
Link Speed (mph)		45			40			45			45	
Link Distance (ft)		899			591			864			643	
Travel Time (s)		13.6			10.1			13.1			9.7	
Peak Hour Factor	0.62	0.67	0.65	0.61	0.48	0.25	0.61	0.82	0.58	0.92	0.87	0.75
Heavy Vehicles (%)	7%	7%	7%	2%	2%	2%	5%	5%	5%	6%	6%	6%
Adj. Flow (vph)	52	36	60	136	65	4	80	149	103	0	144	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	88	60	0	201	4	80	149	103	0	144	44
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Free	Perm	NA	Free	pm+pt	NA	Free	pm+pt	NA	Free
Protected Phases		4			8		5	2		1	6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		Free	8		Free	2		Free	6		Free
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		9.5	23.0		9.5	23.0	
Total Split (%)	40.9%	40.9%		40.9%	40.9%		17.3%	41.8%		17.3%	41.8%	
Maximum Green (s)	18.0	18.0		18.0	18.0		5.0	18.5		5.0	18.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0			11.0	
Pedestrian Calls (#/hr)	0	0		0	0			0			0	
Act Effct Green (s)		10.3	34.9		10.6	34.9	17.7	18.9	34.9		14.1	34.9
Actuated g/C Ratio		0.30	1.00		0.30	1.00	0.51	0.54	1.00		0.40	1.00
v/c Ratio		0.23	0.04		0.48	0.00	0.14	0.15	0.07		0.20	0.03
Control Delay		12.1	0.1		15.4	0.0	7.1	7.2	0.1		13.7	0.0
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay		12.1	0.1		15.4	0.0	7.1	7.2	0.1		13.7	0.0
LOS		B	A		B	A	A	A	A		B	A
Approach Delay		7.2			15.1			5.0			10.5	
Approach LOS		A			B			A			B	

Intersection Summary

Area Type: Other
Cycle Length: 55
Actuated Cycle Length: 34.9
Natural Cycle: 55
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.48
Intersection Signal Delay: 8.9 Intersection LOS: A
Intersection Capacity Utilization 34.9% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 24: Dollarway Rd & Hoadley Rd



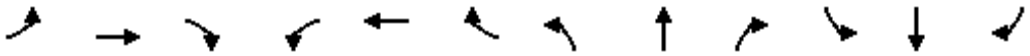
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	24	39	83	31	1	49	122	60	0	125	33
Future Volume (veh/h)	32	24	39	83	31	1	49	122	60	0	125	33
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1870	1870	1870	1826	1826	1826	1811	1811	1811
Adj Flow Rate, veh/h	52	36	0	136	65	0	80	149	0	0	144	0
Peak Hour Factor	0.62	0.67	0.65	0.61	0.48	0.25	0.61	0.82	0.58	0.92	0.87	0.75
Percent Heavy Veh, %	7	7	7	2	2	2	5	5	5	6	6	6
Cap, veh/h	360	181		436	104		580	830		521	353	
Arrive On Green	0.19	0.19	0.00	0.19	0.19	0.00	0.08	0.45	0.00	0.00	0.19	0.00
Sat Flow, veh/h	705	933	1522	1034	534	1585	1739	1826	1547	1725	1811	1535
Grp Volume(v), veh/h	88	0	0	201	0	0	80	149	0	0	144	0
Grp Sat Flow(s),veh/h/ln	1638	0	1522	1568	0	1585	1739	1826	1547	1725	1811	1535
Q Serve(g_s), s	0.0	0.0	0.0	1.9	0.0	0.0	0.8	1.2	0.0	0.0	1.8	0.0
Cycle Q Clear(g_c), s	1.1	0.0	0.0	2.9	0.0	0.0	0.8	1.2	0.0	0.0	1.8	0.0
Prop In Lane	0.59		1.00	0.68		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	542	0		540	0		580	830		521	353	
V/C Ratio(X)	0.16	0.00		0.37	0.00		0.14	0.18		0.00	0.41	
Avail Cap(c_a), veh/h	1278	0		1301	0		771	1316		850	1305	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	8.8	0.0	0.0	9.4	0.0	0.0	5.9	4.2	0.0	0.0	9.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.4	0.0	0.0	0.1	0.1	0.0	0.0	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.6	0.0	0.0	0.1	0.1	0.0	0.0	0.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.9	0.0	0.0	9.9	0.0	0.0	6.0	4.3	0.0	0.0	9.8	0.0
LnGrp LOS	A	A		A	A		A	A		A	A	
Approach Vol, veh/h		88	A		201	A		229	A		144	A
Approach Delay, s/veh		8.9			9.9			4.9			9.8	
Approach LOS		A			A			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	16.2		9.5	6.7	9.5		9.5				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	18.5		18.0	5.0	18.5		18.0				
Max Q Clear Time (g_c+I1), s	0.0	3.2		3.1	2.8	3.8		4.9				
Green Ext Time (p_c), s	0.0	0.5		0.3	0.0	0.5		0.8				

Intersection Summary	
HCM 6th Ctrl Delay	8.0
HCM 6th LOS	A

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	25	32	17	7	13	18	21	8	15	16	13
Future Volume (vph)	36	25	32	17	7	13	18	21	8	15	16	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		190	0		0	0		0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.953				0.850		0.977			0.960	
Flt Protected		0.981			0.967			0.981			0.983	
Satd. Flow (prot)	0	1741	0	0	1801	1583	0	1751	0	0	1645	0
Flt Permitted		0.981			0.967			0.981			0.983	
Satd. Flow (perm)	0	1741	0	0	1801	1583	0	1751	0	0	1645	0
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		303			594			422			385	
Travel Time (s)		5.9			11.6			7.2			6.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	9%	9%	9%
Adj. Flow (vph)	39	27	35	18	8	14	20	23	9	16	17	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	101	0	0	26	14	0	52	0	0	47	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 22.1%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	6.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	36	25	32	17	7	13	18	21	8	15	16	13
Future Vol, veh/h	36	25	32	17	7	13	18	21	8	15	16	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	190	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	4	4	4	9	9	9
Mvmt Flow	39	27	35	18	8	14	20	23	9	16	17	14

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	135	128	24	155	131	28	31	0	0	32	0	0
Stage 1	56	56	-	68	68	-	-	-	-	-	-	-
Stage 2	79	72	-	87	63	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.14	-	-	4.19	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.236	-	-	2.281	-	-
Pot Cap-1 Maneuver	836	763	1052	812	760	1047	1569	-	-	1536	-	-
Stage 1	956	848	-	942	838	-	-	-	-	-	-	-
Stage 2	930	835	-	921	842	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	803	745	1052	749	742	1047	1569	-	-	1536	-	-
Mov Cap-2 Maneuver	803	745	-	749	742	-	-	-	-	-	-	-
Stage 1	944	839	-	930	827	-	-	-	-	-	-	-
Stage 2	897	824	-	852	833	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.8	9.5	2.8	2.5
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1569	-	-	855	747	1047	1536	-	-
HCM Lane V/C Ratio	0.012	-	-	0.118	0.035	0.013	0.011	-	-
HCM Control Delay (s)	7.3	0	-	9.8	10	8.5	7.4	0	-
HCM Lane LOS	A	A	-	A	B	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.4	0.1	0	0	-	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	52	42	83	32	26	93
Future Volume (vph)	52	42	83	32	26	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125	0		0	0	
Storage Lanes	1	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.962			
Flt Protected	0.950					0.989
Satd. Flow (prot)	1752	1568	1792	0	0	1773
Flt Permitted	0.950					0.989
Satd. Flow (perm)	1752	1568	1792	0	0	1773
Link Speed (mph)	25		55			55
Link Distance (ft)	263		258			236
Travel Time (s)	7.2		3.2			2.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	2%	2%	6%	6%
Adj. Flow (vph)	57	46	90	35	28	101
Shared Lane Traffic (%)						
Lane Group Flow (vph)	57	46	125	0	0	129
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 23.0%		ICU Level of Service A	
Analysis Period (min) 15			

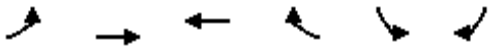
Intersection	
Int Delay, s/veh	3.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	52	42	83	32	26	93
Future Vol, veh/h	52	42	83	32	26	93
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	2	2	6	6
Mvmt Flow	57	46	90	35	28	101

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	265	108	0	0	125	0
Stage 1	108	-	-	-	-	-
Stage 2	157	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.16	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.254	-
Pot Cap-1 Maneuver	722	943	-	-	1437	-
Stage 1	914	-	-	-	-	-
Stage 2	869	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	707	943	-	-	1437	-
Mov Cap-2 Maneuver	707	-	-	-	-	-
Stage 1	895	-	-	-	-	-
Stage 2	869	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.8	0	1.7
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	707	943	1437	-
HCM Lane V/C Ratio	-	-	0.08	0.048	0.02	-
HCM Control Delay (s)	-	-	10.5	9	7.6	0
HCM Lane LOS	-	-	B	A	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0.2	0.1	-



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	33	13	22	1	2	58
Future Volume (vph)	33	13	22	1	2	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.995		0.869	
Flt Protected		0.965			0.998	
Satd. Flow (prot)	0	1780	1818	0	1615	0
Flt Permitted		0.965			0.998	
Satd. Flow (perm)	0	1780	1818	0	1615	0
Link Speed (mph)		25	25		25	
Link Distance (ft)		267	203		489	
Travel Time (s)		7.3	5.5		13.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	4%	4%	2%	2%
Adj. Flow (vph)	36	14	24	1	2	63
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	50	25	0	65	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 19.5%		ICU Level of Service A	
Analysis Period (min) 15			

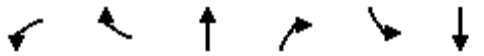
Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	33	13	22	1	2	58
Future Vol, veh/h	33	13	22	1	2	58
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	4	4	2	2
Mvmt Flow	36	14	24	1	2	63

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	25	0	-	0	111	25
Stage 1	-	-	-	-	25	-
Stage 2	-	-	-	-	86	-
Critical Hdwy	4.13	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.227	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1583	-	-	-	886	1051
Stage 1	-	-	-	-	998	-
Stage 2	-	-	-	-	937	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1583	-	-	-	866	1051
Mov Cap-2 Maneuver	-	-	-	-	866	-
Stage 1	-	-	-	-	975	-
Stage 2	-	-	-	-	937	-

Approach	EB	WB	SB
HCM Control Delay, s	5.3	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1583	-	-	-	1044
HCM Lane V/C Ratio	0.023	-	-	-	0.062
HCM Control Delay (s)	7.3	0	-	-	8.7
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	54	0	0	78
Future Volume (vph)	0	0	54	0	0	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1863	0	1863	0	0	1727
Flt Permitted						
Satd. Flow (perm)	1863	0	1863	0	0	1727
Link Speed (mph)	25		45			45
Link Distance (ft)	271		279			285
Travel Time (s)	7.4		4.2			4.3
Peak Hour Factor	0.50	0.46	0.84	0.64	0.50	0.89
Heavy Vehicles (%)	2%	2%	2%	2%	10%	10%
Adj. Flow (vph)	0	0	64	0	0	88
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	64	0	0	88
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 7.4%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	54	0	0	78
Future Vol, veh/h	0	0	54	0	0	78
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	50	46	84	64	50	89
Heavy Vehicles, %	2	2	2	2	10	10
Mvmt Flow	0	0	64	0	0	88

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	152	64	0	0	64	0
Stage 1	64	-	-	-	-	-
Stage 2	88	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.2	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.29	-
Pot Cap-1 Maneuver	840	1000	-	-	1489	-
Stage 1	959	-	-	-	-	-
Stage 2	935	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	840	1000	-	-	1489	-
Mov Cap-2 Maneuver	840	-	-	-	-	-
Stage 1	959	-	-	-	-	-
Stage 2	935	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	1489	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	-	-	0	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	0	0	1	0	0	0
Future Volume (vph)	0	0	1	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected				0.950		
Satd. Flow (prot)	1863	0	0	1736	1863	0
Flt Permitted				0.950		
Satd. Flow (perm)	1863	0	0	1736	1863	0
Link Speed (mph)	25			25	25	
Link Distance (ft)	240			236	303	
Travel Time (s)	6.5			6.4	8.3	
Peak Hour Factor	0.63	0.92	0.25	0.46	0.92	0.92
Heavy Vehicles (%)	2%	2%	4%	4%	2%	2%
Adj. Flow (vph)	0	0	4	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	4	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 6.7%		ICU Level of Service A	
Analysis Period (min) 15			

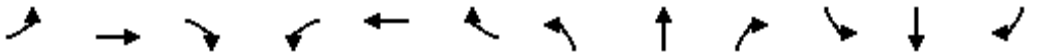
Intersection	
Int Delay, s/veh	5.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	0	0	1	0	0	0
Future Vol, veh/h	0	0	1	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	63	92	25	46	92	92
Heavy Vehicles, %	2	2	4	4	2	2
Mvmt Flow	0	0	4	0	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	2	0	10	2
Stage 1	-	-	-	-	2	-
Stage 2	-	-	-	-	8	-
Critical Hdwy	-	-	4.14	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.236	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1607	-	1010	1082
Stage 1	-	-	-	-	1021	-
Stage 2	-	-	-	-	1015	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1607	-	1008	1082
Mov Cap-2 Maneuver	-	-	-	-	1008	-
Stage 1	-	-	-	-	1019	-
Stage 2	-	-	-	-	1015	-

Approach	EB	WB	NB
HCM Control Delay, s	0	7.2	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1607	-
HCM Lane V/C Ratio	-	-	-	0.002	-
HCM Control Delay (s)	0	-	-	7.2	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	-	-	-	0	-

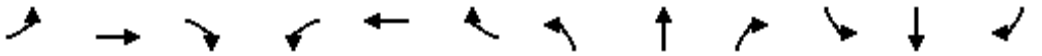


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	24	39	83	31	1	49	122	60	0	125	33
Future Volume (vph)	32	24	39	83	31	1	49	122	60	0	125	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		60	0		45	210		0	85		10
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.972			0.965		0.950					
Satd. Flow (prot)	0	1726	1509	0	1798	1583	1719	1810	1538	1792	1792	1524
Flt Permitted		0.754			0.746		0.517					
Satd. Flow (perm)	0	1339	1509	0	1390	1583	936	1810	1538	1792	1792	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			208			208			208			208
Link Speed (mph)		45			40			45			45	
Link Distance (ft)		899			591			864			643	
Travel Time (s)		13.6			10.1			13.1			9.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	7%	7%	2%	2%	2%	5%	5%	5%	6%	6%	6%
Adj. Flow (vph)	35	26	42	90	34	1	53	133	65	0	136	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	61	42	0	124	1	53	133	65	0	136	36
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Free	Perm	NA	Free	pm+pt	NA	Free	pm+pt	NA	Free
Protected Phases		4			8		5	2		1	6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		Free	8		Free	2		Free	6		Free
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		9.5	23.0		9.5	23.0	
Total Split (%)	40.9%	40.9%		40.9%	40.9%		17.3%	41.8%		17.3%	41.8%	
Maximum Green (s)	18.0	18.0		18.0	18.0		5.0	18.5		5.0	18.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0			11.0	
Pedestrian Calls (#/hr)	0	0		0	0			0			0	
Act Effct Green (s)		8.2	30.7		8.5	30.7	18.2	20.4	30.7		17.5	30.7
Actuated g/C Ratio		0.27	1.00		0.28	1.00	0.59	0.66	1.00		0.57	1.00
v/c Ratio		0.17	0.03		0.32	0.00	0.08	0.11	0.04		0.13	0.02
Control Delay		11.3	0.0		12.8	0.0	5.4	5.4	0.1		10.2	0.0
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay		11.3	0.0		12.8	0.0	5.4	5.4	0.1		10.2	0.0
LOS		B	A		B	A	A	A	A		B	A
Approach Delay		6.7			12.7			4.0			8.1	
Approach LOS		A			B			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 55			
Actuated Cycle Length: 30.7			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.32			
Intersection Signal Delay: 7.2		Intersection LOS: A	
Intersection Capacity Utilization 34.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 24: Dollarway Rd & Hoadley Rd



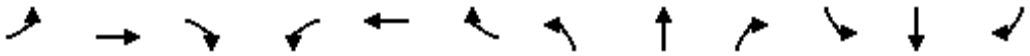
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	24	39	83	31	1	49	122	60	0	125	33
Future Volume (veh/h)	32	24	39	83	31	1	49	122	60	0	125	33
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1870	1870	1870	1826	1826	1826	1811	1811	1811
Adj Flow Rate, veh/h	35	26	0	90	34	0	53	133	0	0	136	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	7	7	7	2	2	2	5	5	5	6	6	6
Cap, veh/h	355	128		433	64		598	853		574	386	
Arrive On Green	0.15	0.15	0.00	0.15	0.15	0.00	0.06	0.47	0.00	0.00	0.21	0.00
Sat Flow, veh/h	758	860	1522	1128	426	1585	1739	1826	1547	1725	1811	1535
Grp Volume(v), veh/h	61	0	0	124	0	0	53	133	0	0	136	0
Grp Sat Flow(s),veh/h/ln	1618	0	1522	1554	0	1585	1739	1826	1547	1725	1811	1535
Q Serve(g_s), s	0.0	0.0	0.0	0.9	0.0	0.0	0.5	1.0	0.0	0.0	1.5	0.0
Cycle Q Clear(g_c), s	0.7	0.0	0.0	1.6	0.0	0.0	0.5	1.0	0.0	0.0	1.5	0.0
Prop In Lane	0.57		1.00	0.73		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	483	0		497	0		598	853		574	386	
V/C Ratio(X)	0.13	0.00		0.25	0.00		0.09	0.16		0.00	0.35	
Avail Cap(c_a), veh/h	1403	0		1418	0		860	1440		934	1428	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	8.8	0.0	0.0	9.2	0.0	0.0	5.2	3.6	0.0	0.0	7.9	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.3	0.0	0.0	0.1	0.1	0.0	0.0	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.9	0.0	0.0	9.4	0.0	0.0	5.3	3.7	0.0	0.0	8.4	0.0
LnGrp LOS	A	A		A	A		A	A		A	A	
Approach Vol, veh/h		61	A		124	A		186	A		136	A
Approach Delay, s/veh		8.9			9.4			4.1			8.4	
Approach LOS		A			A			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	15.5		8.0	6.0	9.5		8.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	18.5		18.0	5.0	18.5		18.0				
Max Q Clear Time (g_c+I1), s	0.0	3.0		2.7	2.5	3.5		3.6				
Green Ext Time (p_c), s	0.0	0.5		0.2	0.0	0.5		0.4				

Intersection Summary	
HCM 6th Ctrl Delay	7.1
HCM 6th LOS	A

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	25	32	17	7	13	18	21	8	15	16	93
Future Volume (vph)	82	25	32	17	7	13	18	21	8	15	16	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		190	0		0	0		0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.969				0.850		0.977			0.898	
Flt Protected		0.971			0.967			0.981			0.994	
Satd. Flow (prot)	0	1753	0	0	1801	1583	0	1751	0	0	1556	0
Flt Permitted		0.971			0.967			0.981			0.994	
Satd. Flow (perm)	0	1753	0	0	1801	1583	0	1751	0	0	1556	0
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		303			594			422			385	
Travel Time (s)		5.9			11.6			7.2			6.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	9%	9%	9%
Adj. Flow (vph)	89	27	35	18	8	14	20	23	9	16	17	101
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	151	0	0	26	14	0	52	0	0	134	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 28.9%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	82	25	32	17	7	13	18	21	8	15	16	93
Future Vol, veh/h	82	25	32	17	7	13	18	21	8	15	16	93
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	190	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	4	4	4	9	9	9
Mvmt Flow	89	27	35	18	8	14	20	23	9	16	17	101

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	179	172	68	199	218	28	118	0	0	32	0	0
Stage 1	100	100	-	68	68	-	-	-	-	-	-	-
Stage 2	79	72	-	131	150	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.14	-	-	4.19	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.236	-	-	2.281	-	-
Pot Cap-1 Maneuver	783	721	995	760	680	1047	1458	-	-	1536	-	-
Stage 1	906	812	-	942	838	-	-	-	-	-	-	-
Stage 2	930	835	-	873	773	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	751	703	995	698	663	1047	1458	-	-	1536	-	-
Mov Cap-2 Maneuver	751	703	-	698	663	-	-	-	-	-	-	-
Stage 1	893	803	-	929	826	-	-	-	-	-	-	-
Stage 2	896	823	-	805	764	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.7	9.7	2.9	0.9
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1458	-	-	786	687	1047	1536	-	-
HCM Lane V/C Ratio	0.013	-	-	0.192	0.038	0.013	0.011	-	-
HCM Control Delay (s)	7.5	0	-	10.7	10.4	8.5	7.4	0	-
HCM Lane LOS	A	A	-	B	B	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.7	0.1	0	0	-	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	167	42	83	116	26	93
Future Volume (vph)	167	42	83	116	26	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125	0		0	0	
Storage Lanes	1	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.921			
Flt Protected	0.950					0.989
Satd. Flow (prot)	1752	1568	1716	0	0	1773
Flt Permitted	0.950					0.989
Satd. Flow (perm)	1752	1568	1716	0	0	1773
Link Speed (mph)	25		55			55
Link Distance (ft)	263		258			236
Travel Time (s)	7.2		3.2			2.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	2%	2%	6%	6%
Adj. Flow (vph)	182	46	90	126	28	101
Shared Lane Traffic (%)						
Lane Group Flow (vph)	182	46	216	0	0	129
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 37.1%		ICU Level of Service A	
Analysis Period (min) 15			

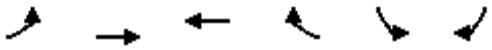
Intersection	
Int Delay, s/veh	5.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	167	42	83	116	26	93
Future Vol, veh/h	167	42	83	116	26	93
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	2	2	6	6
Mvmt Flow	182	46	90	126	28	101

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	310	153	0	0	216	0
Stage 1	153	-	-	-	-	-
Stage 2	157	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.16	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.254	-
Pot Cap-1 Maneuver	680	890	-	-	1330	-
Stage 1	873	-	-	-	-	-
Stage 2	869	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	665	890	-	-	1330	-
Mov Cap-2 Maneuver	665	-	-	-	-	-
Stage 1	854	-	-	-	-	-
Stage 2	869	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.8	0	1.7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	665	890	1330	-
HCM Lane V/C Ratio	-	-	0.273	0.051	0.021	-
HCM Control Delay (s)	-	-	12.4	9.3	7.8	0
HCM Lane LOS	-	-	B	A	A	A
HCM 95th %tile Q(veh)	-	-	1.1	0.2	0.1	-



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	33	106	60	1	2	58
Future Volume (vph)	33	106	60	1	2	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.998		0.869	
Flt Protected		0.988			0.998	
Satd. Flow (prot)	0	1823	1823	0	1615	0
Flt Permitted		0.988			0.998	
Satd. Flow (perm)	0	1823	1823	0	1615	0
Link Speed (mph)		25	25		25	
Link Distance (ft)		267	203		489	
Travel Time (s)		7.3	5.5		13.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	4%	4%	2%	2%
Adj. Flow (vph)	36	115	65	1	2	63
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	151	66	0	65	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 24.4%		ICU Level of Service A	
Analysis Period (min) 15			

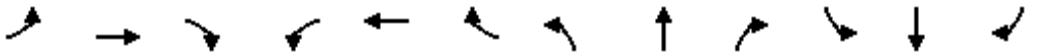
Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	33	106	60	1	2	58
Future Vol, veh/h	33	106	60	1	2	58
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	4	4	2	2
Mvmt Flow	36	115	65	1	2	63

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	66	0	-	0	253	66
Stage 1	-	-	-	-	66	-
Stage 2	-	-	-	-	187	-
Critical Hdwy	4.13	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.227	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1529	-	-	-	736	998
Stage 1	-	-	-	-	957	-
Stage 2	-	-	-	-	845	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1529	-	-	-	718	998
Mov Cap-2 Maneuver	-	-	-	-	718	-
Stage 1	-	-	-	-	933	-
Stage 2	-	-	-	-	845	-

Approach	EB	WB	SB
HCM Control Delay, s	1.8	0	8.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1529	-	-	-	985
HCM Lane V/C Ratio	0.023	-	-	-	0.066
HCM Control Delay (s)	7.4	0	-	-	8.9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

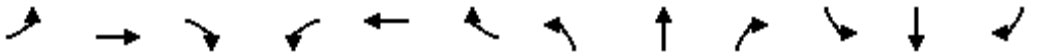


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	24	39	83	31	95	49	122	60	58	125	33
Future Volume (vph)	32	24	39	83	31	95	49	122	60	58	125	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		60	0		45	210		0	85		10
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.972			0.965		0.950			0.950		
Satd. Flow (prot)	0	1726	1509	0	1798	1583	1719	1810	1538	1703	1792	1524
Flt Permitted		0.754			0.746		0.670			0.672		
Satd. Flow (perm)	0	1339	1509	0	1390	1583	1212	1810	1538	1205	1792	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			208			208			208			208
Link Speed (mph)		45			40			45			45	
Link Distance (ft)		899			591			864			643	
Travel Time (s)		13.6			10.1			13.1			9.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	7%	7%	2%	2%	2%	5%	5%	5%	6%	6%	6%
Adj. Flow (vph)	35	26	42	90	34	103	53	133	65	63	136	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	61	42	0	124	103	53	133	65	63	136	36
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Free	Perm	NA	Free	pm+pt	NA	Free	pm+pt	NA	Free
Protected Phases		4			8		5	2		1	6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		Free	8		Free	2		Free	6		Free
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		9.5	23.0		9.5	23.0	
Total Split (%)	40.9%	40.9%		40.9%	40.9%		17.3%	41.8%		17.3%	41.8%	
Maximum Green (s)	18.0	18.0		18.0	18.0		5.0	18.5		5.0	18.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0			11.0	
Pedestrian Calls (#/hr)	0	0		0	0			0			0	
Act Effct Green (s)		8.3	29.9		8.6	29.9	16.0	16.9	29.9	16.0	16.9	29.9
Actuated g/C Ratio		0.28	1.00		0.29	1.00	0.54	0.57	1.00	0.54	0.57	1.00
v/c Ratio		0.16	0.03		0.31	0.07	0.07	0.13	0.04	0.09	0.13	0.02
Control Delay		11.1	0.0		12.4	0.1	5.7	10.2	0.1	5.7	10.2	0.0
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		11.1	0.0		12.4	0.1	5.7	10.2	0.1	5.7	10.2	0.0
LOS		B	A		B	A	A	B	A	A	B	A
Approach Delay		6.6			6.8			6.6			7.5	
Approach LOS		A			A			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 55			
Actuated Cycle Length: 29.9			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.31			
Intersection Signal Delay: 6.9		Intersection LOS: A	
Intersection Capacity Utilization 34.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 24: Dollarway Rd & Hoadley Rd



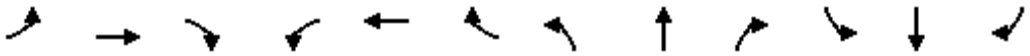
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	24	39	83	31	95	49	122	60	58	125	33
Future Volume (veh/h)	32	24	39	83	31	95	49	122	60	58	125	33
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1870	1870	1870	1826	1826	1826	1811	1811	1811
Adj Flow Rate, veh/h	35	26	0	90	34	0	53	133	0	63	136	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	7	7	7	2	2	2	5	5	5	6	6	6
Cap, veh/h	351	128		429	63		604	385		608	399	
Arrive On Green	0.15	0.15	0.00	0.15	0.15	0.00	0.06	0.21	0.00	0.07	0.22	0.00
Sat Flow, veh/h	757	862	1522	1128	426	1585	1739	1826	1547	1725	1811	1535
Grp Volume(v), veh/h	61	0	0	124	0	0	53	133	0	63	136	0
Grp Sat Flow(s),veh/h/ln	1619	0	1522	1554	0	1585	1739	1826	1547	1725	1811	1535
Q Serve(g_s), s	0.0	0.0	0.0	1.0	0.0	0.0	0.5	1.5	0.0	0.6	1.5	0.0
Cycle Q Clear(g_c), s	0.7	0.0	0.0	1.7	0.0	0.0	0.5	1.5	0.0	0.6	1.5	0.0
Prop In Lane	0.57		1.00	0.73		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	479	0		493	0		604	385		608	399	
V/C Ratio(X)	0.13	0.00		0.25	0.00		0.09	0.35		0.10	0.34	
Avail Cap(c_a), veh/h	1388	0		1403	0		862	1424		848	1412	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	8.9	0.0	0.0	9.3	0.0	0.0	6.5	8.0	0.0	6.4	7.8	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.3	0.0	0.0	0.1	0.5	0.0	0.1	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.3	0.0	0.0	0.1	0.3	0.0	0.1	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.0	0.0	0.0	9.5	0.0	0.0	6.6	8.5	0.0	6.5	8.3	0.0
LnGrp LOS	A	A		A	A		A	A		A	A	
Approach Vol, veh/h		61	A		124	A		186	A		199	A
Approach Delay, s/veh		9.0			9.5			7.9			7.7	
Approach LOS		A			A			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.2	9.5		8.0	6.0	9.7		8.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	18.5		18.0	5.0	18.5		18.0				
Max Q Clear Time (g_c+I1), s	2.6	3.5		2.7	2.5	3.5		3.7				
Green Ext Time (p_c), s	0.0	0.5		0.2	0.0	0.5		0.4				

Intersection Summary			
HCM 6th Ctrl Delay		8.3	
HCM 6th LOS		A	

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	2	1	4	102	11	55	16	11	8	5	57
Future Volume (vph)	14	2	1	4	102	11	55	16	11	8	5	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		190	0		0	0		0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.981				0.850		0.973			0.908	
Flt Protected		0.966			0.997			0.972			0.988	
Satd. Flow (prot)	0	1765	0	0	1857	1583	0	1762	0	0	1671	0
Flt Permitted		0.966			0.997			0.972			0.988	
Satd. Flow (perm)	0	1765	0	0	1857	1583	0	1762	0	0	1671	0
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		303			594			422			385	
Travel Time (s)		5.9			11.6			7.2			6.6	
Peak Hour Factor	0.70	0.50	0.25	0.33	0.47	0.46	0.81	0.57	0.46	0.33	0.63	0.84
Adj. Flow (vph)	20	4	4	12	217	24	68	28	24	24	8	68
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	28	0	0	229	24	0	120	0	0	100	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 25.5%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	9.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	2	1	4	102	11	55	16	11	8	5	57
Future Vol, veh/h	14	2	1	4	102	11	55	16	11	8	5	57
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	190	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	70	50	25	33	47	46	81	57	46	33	63	84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	20	4	4	12	217	24	68	28	24	24	8	68

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	387	278	42	270	300	40	76	0	0	52	0	0
Stage 1	90	90	-	176	176	-	-	-	-	-	-	-
Stage 2	297	188	-	94	124	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	572	630	1029	683	612	1031	1523	-	-	1554	-	-
Stage 1	917	820	-	826	753	-	-	-	-	-	-	-
Stage 2	712	745	-	913	793	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	378	592	1029	645	575	1031	1523	-	-	1554	-	-
Mov Cap-2 Maneuver	378	592	-	645	575	-	-	-	-	-	-	-
Stage 1	875	807	-	788	718	-	-	-	-	-	-	-
Stage 2	463	711	-	890	780	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.7	14.7	4.2	1.8
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1523	-	-	441	578	1031	1554	-	-
HCM Lane V/C Ratio	0.045	-	-	0.063	0.396	0.023	0.016	-	-
HCM Control Delay (s)	7.5	0	-	13.7	15.3	8.6	7.4	0	-
HCM Lane LOS	A	A	-	B	C	A	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	1.9	0.1	0	-	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	54	27	145	6	3	107
Future Volume (vph)	54	27	145	6	3	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125	0		0	0	
Storage Lanes	1	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.992			
Flt Protected	0.950					0.997
Satd. Flow (prot)	1770	1583	1848	0	0	1787
Flt Permitted	0.950					0.997
Satd. Flow (perm)	1770	1583	1848	0	0	1787
Link Speed (mph)	25		55			55
Link Distance (ft)	263		258			236
Travel Time (s)	7.2		3.2			2.9
Peak Hour Factor	0.52	0.48	0.76	0.50	0.38	0.79
Heavy Vehicles (%)	2%	2%	2%	2%	6%	6%
Adj. Flow (vph)	104	56	191	12	8	135
Shared Lane Traffic (%)						
Lane Group Flow (vph)	104	56	203	0	0	143
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 18.0%		ICU Level of Service A	
Analysis Period (min) 15			

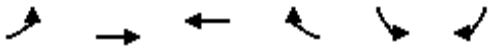
Intersection	
Int Delay, s/veh	3.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	54	27	145	6	3	107
Future Vol, veh/h	54	27	145	6	3	107
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	52	48	76	50	38	79
Heavy Vehicles, %	2	2	2	2	6	6
Mvmt Flow	104	56	191	12	8	135

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	348	197	0	0	203	0
Stage 1	197	-	-	-	-	-
Stage 2	151	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.16	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.254	-
Pot Cap-1 Maneuver	649	844	-	-	1345	-
Stage 1	836	-	-	-	-	-
Stage 2	877	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	645	844	-	-	1345	-
Mov Cap-2 Maneuver	645	-	-	-	-	-
Stage 1	831	-	-	-	-	-
Stage 2	877	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.9	0	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	645	844	1345	-
HCM Lane V/C Ratio	-	-	0.161	0.067	0.006	-
HCM Control Delay (s)	-	-	11.6	9.6	7.7	0
HCM Lane LOS	-	-	B	A	A	A
HCM 95th %tile Q(veh)	-	-	0.6	0.2	0	-



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	1	4	49	0	0	41
Future Volume (vph)	1	4	49	0	0	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected		0.988				
Satd. Flow (prot)	0	1840	1863	0	1611	0
Flt Permitted		0.988				
Satd. Flow (perm)	0	1840	1863	0	1611	0
Link Speed (mph)		25	25		25	
Link Distance (ft)		267	203		489	
Travel Time (s)		7.3	5.5		13.3	
Peak Hour Factor	0.25	0.33	0.58	0.92	0.92	0.64
Adj. Flow (vph)	4	12	84	0	0	64
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	16	84	0	64	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			

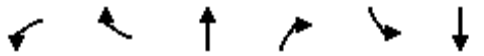
Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	4	49	0	0	41
Future Vol, veh/h	1	4	49	0	0	41
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	25	33	58	92	92	64
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	12	84	0	0	64

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	84	0	-	0	104	84
Stage 1	-	-	-	-	84	-
Stage 2	-	-	-	-	20	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1513	-	-	-	894	975
Stage 1	-	-	-	-	939	-
Stage 2	-	-	-	-	1003	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1513	-	-	-	891	975
Mov Cap-2 Maneuver	-	-	-	-	891	-
Stage 1	-	-	-	-	936	-
Stage 2	-	-	-	-	1003	-

Approach	EB	WB	SB
HCM Control Delay, s	1.8	0	9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1513	-	-	-	975
HCM Lane V/C Ratio	0.003	-	-	-	0.066
HCM Control Delay (s)	7.4	0	-	-	9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.2



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	92	76	142	22	3	85
Future Volume (vph)	92	76	142	22	3	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.943		0.979			
Flt Protected	0.972					0.998
Satd. Flow (prot)	1707	0	1824	0	0	1841
Flt Permitted	0.972					0.998
Satd. Flow (perm)	1707	0	1824	0	0	1841
Link Speed (mph)	25		45			45
Link Distance (ft)	271		279			285
Travel Time (s)	7.4		4.2			4.3
Peak Hour Factor	0.77	0.86	0.96	0.79	0.75	0.85
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%
Adj. Flow (vph)	119	88	148	28	4	100
Shared Lane Traffic (%)						
Lane Group Flow (vph)	207	0	176	0	0	104
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 25.2%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	4.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	92	76	142	22	3	85
Future Vol, veh/h	92	76	142	22	3	85
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	77	86	96	79	75	85
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	119	88	148	28	4	100

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	270	162	0	0	176	0
Stage 1	162	-	-	-	-	-
Stage 2	108	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.13	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.227	-
Pot Cap-1 Maneuver	719	883	-	-	1394	-
Stage 1	867	-	-	-	-	-
Stage 2	916	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	717	883	-	-	1394	-
Mov Cap-2 Maneuver	717	-	-	-	-	-
Stage 1	864	-	-	-	-	-
Stage 2	916	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.3	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	779	1394	-
HCM Lane V/C Ratio	-	-	0.267	0.003	-
HCM Control Delay (s)	-	-	11.3	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	1.1	0	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	2	1	1	160	2	0
Future Volume (vph)	2	1	1	160	2	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.932					
Flt Protected				0.999	0.950	
Satd. Flow (prot)	1736	0	0	1861	1770	0
Flt Permitted				0.999	0.950	
Satd. Flow (perm)	1736	0	0	1861	1770	0
Link Speed (mph)	25			25	25	
Link Distance (ft)	240			236	303	
Travel Time (s)	6.5			6.4	8.3	
Peak Hour Factor	0.50	0.25	0.25	0.74	0.50	0.92
Adj. Flow (vph)	4	4	4	216	4	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	8	0	0	220	4	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 19.2%		ICU Level of Service A	
Analysis Period (min) 15			

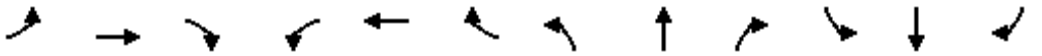
Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	2	1	1	160	2	0
Future Vol, veh/h	2	1	1	160	2	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	50	25	25	74	50	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	4	4	216	4	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	8	0	230	6
Stage 1	-	-	-	-	6	-
Stage 2	-	-	-	-	224	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1612	-	758	1077
Stage 1	-	-	-	-	1017	-
Stage 2	-	-	-	-	813	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1612	-	756	1077
Mov Cap-2 Maneuver	-	-	-	-	756	-
Stage 1	-	-	-	-	1014	-
Stage 2	-	-	-	-	813	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	9.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	756	-	-	1612	-
HCM Lane V/C Ratio	0.005	-	-	0.002	-
HCM Control Delay (s)	9.8	-	-	7.2	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

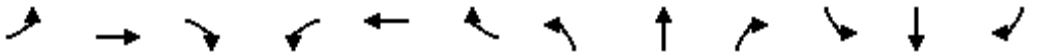


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	15	62	84	144	4	117	222	20	1	170	66
Future Volume (vph)	56	15	62	84	144	4	117	222	20	1	170	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		60	0		45	210		0	85		10
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.966			0.982		0.950			0.950		
Satd. Flow (prot)	0	1799	1583	0	1829	1583	1752	1845	1568	1752	1845	1568
Flt Permitted		0.615			0.841		0.526			0.593		
Satd. Flow (perm)	0	1146	1583	0	1567	1583	970	1845	1568	1094	1845	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			208			208			208			208
Link Speed (mph)		45			40			45			45	
Link Distance (ft)		899			591			864			643	
Travel Time (s)		13.6			10.1			13.1			9.7	
Peak Hour Factor	0.88	0.54	0.74	0.70	0.69	0.50	0.91	0.82	0.45	0.25	0.85	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	64	28	84	120	209	8	129	271	44	4	200	72
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	92	84	0	329	8	129	271	44	4	200	72
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Free	Perm	NA	Free	pm+pt	NA	Free	pm+pt	NA	Free
Protected Phases		4			8		5	2		1	6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		Free	8		Free	2		Free	6		Free
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		9.5	23.0		9.5	23.0	
Total Split (%)	40.9%	40.9%		40.9%	40.9%		17.3%	41.8%		17.3%	41.8%	
Maximum Green (s)	18.0	18.0		18.0	18.0		5.0	18.5		5.0	18.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0			11.0	
Pedestrian Calls (#/hr)	0	0		0	0			0			0	
Act Effct Green (s)		13.3	42.0		13.3	42.0	18.6	17.9	42.0	15.9	12.1	42.0
Actuated g/C Ratio		0.32	1.00		0.32	1.00	0.44	0.43	1.00	0.38	0.29	1.00
v/c Ratio		0.25	0.05		0.66	0.01	0.24	0.35	0.03	0.01	0.38	0.05
Control Delay		13.9	0.1		20.8	0.0	8.5	11.5	0.1	7.0	16.3	0.1
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		13.9	0.1		20.8	0.0	8.5	11.5	0.1	7.0	16.3	0.1
LOS		B	A		C	A	A	B	A	A	B	A
Approach Delay		7.3			20.3			9.5			11.9	
Approach LOS		A			C			A			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 55			
Actuated Cycle Length: 42			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.66			
Intersection Signal Delay: 12.7		Intersection LOS: B	
Intersection Capacity Utilization 47.2%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 24: Dollarway Rd & Hoadley Rd



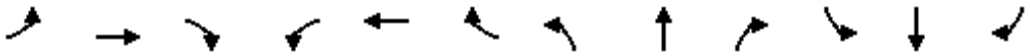
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	15	62	84	144	4	117	222	20	1	170	66
Future Volume (veh/h)	56	15	62	84	144	4	117	222	20	1	170	66
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	64	28	0	120	209	0	129	271	0	4	200	0
Peak Hour Factor	0.88	0.54	0.74	0.70	0.69	0.50	0.91	0.82	0.45	0.25	0.85	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	3	3	3	3	3	3
Cap, veh/h	454	165		295	323		526	536		425	346	
Arrive On Green	0.27	0.27	0.00	0.27	0.27	0.00	0.11	0.29	0.00	0.01	0.19	0.00
Sat Flow, veh/h	948	607	1585	503	1190	1585	1767	1856	1572	1767	1856	1572
Grp Volume(v), veh/h	92	0	0	329	0	0	129	271	0	4	200	0
Grp Sat Flow(s),veh/h/ln	1555	0	1585	1693	0	1585	1767	1856	1572	1767	1856	1572
Q Serve(g_s), s	0.0	0.0	0.0	4.0	0.0	0.0	1.7	3.8	0.0	0.1	3.1	0.0
Cycle Q Clear(g_c), s	1.2	0.0	0.0	5.4	0.0	0.0	1.7	3.8	0.0	0.1	3.1	0.0
Prop In Lane	0.70		1.00	0.36		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	619	0		618	0		526	536		425	346	
V/C Ratio(X)	0.15	0.00		0.53	0.00		0.25	0.51		0.01	0.58	
Avail Cap(c_a), veh/h	1024	0		1126	0		619	1103		699	1103	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	8.7	0.0	0.0	10.2	0.0	0.0	8.1	9.2	0.0	10.2	11.5	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.7	0.0	0.0	0.2	0.7	0.0	0.0	1.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	1.3	0.0	0.0	0.4	0.9	0.0	0.0	0.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.8	0.0	0.0	10.9	0.0	0.0	8.3	9.9	0.0	10.2	13.1	0.0
LnGrp LOS	A	A		B	A		A	A		B	B	
Approach Vol, veh/h		92	A		329	A		400	A		204	A
Approach Delay, s/veh		8.8			10.9			9.4			13.0	
Approach LOS		A			B			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.7	13.5		13.0	7.9	10.3		13.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	18.5		18.0	5.0	18.5		18.0				
Max Q Clear Time (g_c+I1), s	2.1	5.8		3.2	3.7	5.1		7.4				
Green Ext Time (p_c), s	0.0	1.1		0.3	0.0	0.7		1.3				

Intersection Summary			
HCM 6th Ctrl Delay		10.5	
HCM 6th LOS		B	

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	2	1	4	102	11	55	16	11	8	5	57
Future Volume (vph)	14	2	1	4	102	11	55	16	11	8	5	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		190	0		0	0		0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992				0.850		0.982			0.890	
Flt Protected		0.960			0.998			0.967			0.994	
Satd. Flow (prot)	0	1774	0	0	1859	1583	0	1769	0	0	1648	0
Flt Permitted		0.960			0.998			0.967			0.994	
Satd. Flow (perm)	0	1774	0	0	1859	1583	0	1769	0	0	1648	0
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		303			594			422			385	
Travel Time (s)		5.9			11.6			7.2			6.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	2	1	4	111	12	60	17	12	9	5	62
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	18	0	0	115	12	0	89	0	0	76	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 25.5%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↰	↗		↕			↕	
Traffic Vol, veh/h	14	2	1	4	102	11	55	16	11	8	5	57
Future Vol, veh/h	14	2	1	4	102	11	55	16	11	8	5	57
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	190	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	2	1	4	111	12	60	17	12	9	5	62

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	259	203	36	199	228	23	67	0	0	29	0	0
Stage 1	54	54	-	143	143	-	-	-	-	-	-	-
Stage 2	205	149	-	56	85	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	694	693	1037	760	671	1054	1535	-	-	1584	-	-
Stage 1	958	850	-	860	779	-	-	-	-	-	-	-
Stage 2	797	774	-	956	824	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	575	661	1037	731	640	1054	1535	-	-	1584	-	-
Mov Cap-2 Maneuver	575	661	-	731	640	-	-	-	-	-	-	-
Stage 1	920	845	-	826	748	-	-	-	-	-	-	-
Stage 2	644	743	-	947	819	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.2	11.5	5	0.8
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1535	-	-	600	643	1054	1584	-	-
HCM Lane V/C Ratio	0.039	-	-	0.031	0.179	0.011	0.005	-	-
HCM Control Delay (s)	7.4	0	-	11.2	11.8	8.5	7.3	0	-
HCM Lane LOS	A	A	-	B	B	A	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.6	0	0	-	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	54	195	145	6	28	107
Future Volume (vph)	54	195	145	6	28	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125	0		0	0	
Storage Lanes	1	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.994			
Flt Protected	0.950					0.990
Satd. Flow (prot)	1770	1583	1852	0	0	1775
Flt Permitted	0.950					0.990
Satd. Flow (perm)	1770	1583	1852	0	0	1775
Link Speed (mph)	25		55			55
Link Distance (ft)	263		258			236
Travel Time (s)	7.2		3.2			2.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	6%	6%
Adj. Flow (vph)	59	212	158	7	30	116
Shared Lane Traffic (%)						
Lane Group Flow (vph)	59	212	165	0	0	146
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 28.5%		ICU Level of Service A	
Analysis Period (min) 15			

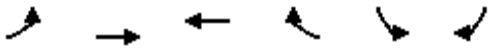
Intersection	
Int Delay, s/veh	5.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	54	195	145	6	28	107
Future Vol, veh/h	54	195	145	6	28	107
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	6	6
Mvmt Flow	59	212	158	7	30	116

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	338	162	0	0	165	0
Stage 1	162	-	-	-	-	-
Stage 2	176	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.16	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.254	-
Pot Cap-1 Maneuver	658	883	-	-	1389	-
Stage 1	867	-	-	-	-	-
Stage 2	855	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	643	883	-	-	1389	-
Mov Cap-2 Maneuver	643	-	-	-	-	-
Stage 1	847	-	-	-	-	-
Stage 2	855	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.6	0	1.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	643	883	1389	-
HCM Lane V/C Ratio	-	-	0.091	0.24	0.022	-
HCM Control Delay (s)	-	-	11.2	10.4	7.7	0
HCM Lane LOS	-	-	B	B	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0.9	0.1	-



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	4	4	49	0	0	203
Future Volume (vph)	4	4	49	0	0	203
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected		0.976				
Satd. Flow (prot)	0	1818	1863	0	1611	0
Flt Permitted		0.976				
Satd. Flow (perm)	0	1818	1863	0	1611	0
Link Speed (mph)		25	25		25	
Link Distance (ft)		267	203		489	
Travel Time (s)		7.3	5.5		13.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	4	53	0	0	221
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	8	53	0	221	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 23.0%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	7.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	4	49	0	0	203
Future Vol, veh/h	4	4	49	0	0	203
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	4	53	0	0	221

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	53	0	-	0	65	53
Stage 1	-	-	-	-	53	-
Stage 2	-	-	-	-	12	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1553	-	-	-	941	1014
Stage 1	-	-	-	-	970	-
Stage 2	-	-	-	-	1011	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1553	-	-	-	938	1014
Mov Cap-2 Maneuver	-	-	-	-	938	-
Stage 1	-	-	-	-	967	-
Stage 2	-	-	-	-	1011	-

Approach	EB	WB	SB
HCM Control Delay, s	3.7	0	9.5
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1553	-	-	-	1014
HCM Lane V/C Ratio	0.003	-	-	-	0.218
HCM Control Delay (s)	7.3	0	-	-	9.5
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.8

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	142	0	0	85
Future Volume (vph)	0	0	142	0	0	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1863	0	1863	0	0	1845
Flt Permitted						
Satd. Flow (perm)	1863	0	1863	0	0	1845
Link Speed (mph)	25		45			45
Link Distance (ft)	271		279			285
Travel Time (s)	7.4		4.2			4.3
Peak Hour Factor	0.77	0.86	0.96	0.79	0.75	0.85
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%
Adj. Flow (vph)	0	0	148	0	0	100
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	148	0	0	100
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 10.8%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	142	0	0	85
Future Vol, veh/h	0	0	142	0	0	85
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	77	86	96	79	75	85
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	0	0	148	0	0	100

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	248	148	0	0	148	0
Stage 1	148	-	-	-	-	-
Stage 2	100	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.13	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.227	-
Pot Cap-1 Maneuver	740	899	-	-	1427	-
Stage 1	880	-	-	-	-	-
Stage 2	924	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	740	899	-	-	1427	-
Mov Cap-2 Maneuver	740	-	-	-	-	-
Stage 1	880	-	-	-	-	-
Stage 2	924	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	1427	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	-	-	0	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	0	0	1	0	0	0
Future Volume (vph)	0	0	1	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected				0.950		
Satd. Flow (prot)	1863	0	0	1770	1863	0
Flt Permitted				0.950		
Satd. Flow (perm)	1863	0	0	1770	1863	0
Link Speed (mph)	25			25	25	
Link Distance (ft)	240			236	303	
Travel Time (s)	6.5			6.4	8.3	
Peak Hour Factor	0.50	0.25	0.25	0.74	0.50	0.92
Adj. Flow (vph)	0	0	4	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	4	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 6.7%		ICU Level of Service A	
Analysis Period (min) 15			

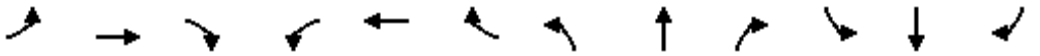
Intersection	
Int Delay, s/veh	4.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	0	0	1	0	0	0
Future Vol, veh/h	0	0	1	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	50	25	25	74	50	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	4	0	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	2	0	10	2
Stage 1	-	-	-	-	2	-
Stage 2	-	-	-	-	8	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1620	-	1010	1082
Stage 1	-	-	-	-	1021	-
Stage 2	-	-	-	-	1015	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1620	-	1008	1082
Mov Cap-2 Maneuver	-	-	-	-	1008	-
Stage 1	-	-	-	-	1019	-
Stage 2	-	-	-	-	1015	-

Approach	EB	WB	NB
HCM Control Delay, s	0	7.2	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1620	-
HCM Lane V/C Ratio	-	-	-	0.002	-
HCM Control Delay (s)	0	-	-	7.2	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	-	-	-	0	-

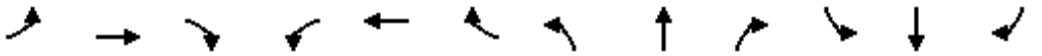


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	15	62	84	144	4	117	222	20	1	170	66
Future Volume (vph)	56	15	62	84	144	4	117	222	20	1	170	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		60	0		45	210		0	85		10
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.962			0.982		0.950			0.950		
Satd. Flow (prot)	0	1792	1583	0	1829	1583	1752	1845	1568	1752	1845	1568
Flt Permitted		0.653			0.847		0.523			0.609		
Satd. Flow (perm)	0	1216	1583	0	1578	1583	965	1845	1568	1123	1845	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			208			208			208			208
Link Speed (mph)		45			40			45			45	
Link Distance (ft)		899			591			864			643	
Travel Time (s)		13.6			10.1			13.1			9.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	61	16	67	91	157	4	127	241	22	1	185	72
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	77	67	0	248	4	127	241	22	1	185	72
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Free	Perm	NA	Free	pm+pt	NA	Free	pm+pt	NA	Free
Protected Phases		4			8		5	2		1	6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		Free	8		Free	2		Free	6		Free
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		10.0	23.0		9.5	22.5	
Total Split (%)	40.9%	40.9%		40.9%	40.9%		18.2%	41.8%		17.3%	40.9%	
Maximum Green (s)	18.0	18.0		18.0	18.0		5.5	18.5		5.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0			11.0	
Pedestrian Calls (#/hr)	0	0		0	0			0			0	
Act Effct Green (s)		11.6	41.9		11.6	41.9	20.5	19.6	41.9	17.1	13.2	41.9
Actuated g/C Ratio		0.28	1.00		0.28	1.00	0.49	0.47	1.00	0.41	0.32	1.00
v/c Ratio		0.23	0.04		0.57	0.00	0.22	0.28	0.01	0.00	0.32	0.05
Control Delay		13.6	0.0		18.7	0.0	7.7	10.3	0.0	7.0	15.3	0.1
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		13.6	0.0		18.7	0.0	7.7	10.3	0.0	7.0	15.3	0.1
LOS		B	A		B	A	A	B	A	A	B	A
Approach Delay		7.3			18.4			8.9			11.0	
Approach LOS		A			B			A			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 55			
Actuated Cycle Length: 41.9			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.57			
Intersection Signal Delay: 11.5		Intersection LOS: B	
Intersection Capacity Utilization 47.2%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 24: Dollarway Rd & Hoadley Rd



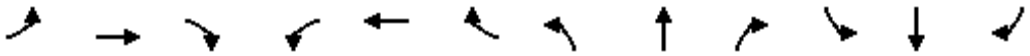
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	15	62	84	144	4	117	222	20	1	170	66
Future Volume (veh/h)	56	15	62	84	144	4	117	222	20	1	170	66
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	61	16	0	91	157	0	127	241	0	1	185	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	3	3	3	3	3	3
Cap, veh/h	483	101		286	262		570	550		474	345	
Arrive On Green	0.22	0.22	0.00	0.22	0.22	0.00	0.11	0.30	0.00	0.00	0.19	0.00
Sat Flow, veh/h	1153	462	1585	503	1197	1585	1767	1856	1572	1767	1856	1572
Grp Volume(v), veh/h	77	0	0	248	0	0	127	241	0	1	185	0
Grp Sat Flow(s),veh/h/ln	1615	0	1585	1700	0	1585	1767	1856	1572	1767	1856	1572
Q Serve(g_s), s	0.0	0.0	0.0	2.6	0.0	0.0	1.5	2.9	0.0	0.0	2.5	0.0
Cycle Q Clear(g_c), s	1.0	0.0	0.0	3.7	0.0	0.0	1.5	2.9	0.0	0.0	2.5	0.0
Prop In Lane	0.79		1.00	0.37		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	584	0		548	0		570	550		474	345	
V/C Ratio(X)	0.13	0.00		0.45	0.00		0.22	0.44		0.00	0.54	
Avail Cap(c_a), veh/h	1147	0		1256	0		719	1229		784	1195	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	8.9	0.0	0.0	9.9	0.0	0.0	7.2	7.9	0.0	9.2	10.3	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.6	0.0	0.0	0.2	0.5	0.0	0.0	1.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.9	0.0	0.0	0.3	0.6	0.0	0.0	0.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.0	0.0	0.0	10.5	0.0	0.0	7.4	8.5	0.0	9.2	11.6	0.0
LnGrp LOS	A	A		B	A		A	A		A	B	
Approach Vol, veh/h		77	A		248	A		368	A		186	A
Approach Delay, s/veh		9.0			10.5			8.1			11.6	
Approach LOS		A			B			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.5	12.8		10.6	7.6	9.7		10.6				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	18.5		18.0	5.5	18.0		18.0				
Max Q Clear Time (g_c+I1), s	2.0	4.9		3.0	3.5	4.5		5.7				
Green Ext Time (p_c), s	0.0	1.0		0.2	0.1	0.7		1.0				

Intersection Summary	
HCM 6th Ctrl Delay	9.6
HCM 6th LOS	A

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	2	1	4	102	11	55	16	11	8	5	309
Future Volume (vph)	22	2	1	4	102	11	55	16	11	8	5	309
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		190	0		0	0		0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995				0.850		0.982			0.870	
Flt Protected		0.957			0.998			0.967			0.999	
Satd. Flow (prot)	0	1774	0	0	1859	1583	0	1769	0	0	1619	0
Flt Permitted		0.957			0.998			0.967			0.999	
Satd. Flow (perm)	0	1774	0	0	1859	1583	0	1769	0	0	1619	0
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		303			594			422			385	
Travel Time (s)		5.9			11.6			7.2			6.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	2	1	4	111	12	60	17	12	9	5	336
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	27	0	0	115	12	0	89	0	0	350	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 42.4%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	22	2	1	4	102	11	55	16	11	8	5	309
Future Vol, veh/h	22	2	1	4	102	11	55	16	11	8	5	309
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	190	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	24	2	1	4	111	12	60	17	12	9	5	336

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	396	340	173	336	502	23	341	0	0	29	0	0
Stage 1	191	191	-	143	143	-	-	-	-	-	-	-
Stage 2	205	149	-	193	359	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	564	582	871	618	471	1054	1218	-	-	1584	-	-
Stage 1	811	742	-	860	779	-	-	-	-	-	-	-
Stage 2	797	774	-	809	627	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	431	549	871	589	444	1054	1218	-	-	1584	-	-
Mov Cap-2 Maneuver	431	549	-	589	444	-	-	-	-	-	-	-
Stage 1	770	737	-	817	740	-	-	-	-	-	-	-
Stage 2	636	735	-	800	623	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.6	15.1	5.4	0.2
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1218	-	-	448	448	1054	1584	-	-
HCM Lane V/C Ratio	0.049	-	-	0.061	0.257	0.011	0.005	-	-
HCM Control Delay (s)	8.1	0	-	13.6	15.8	8.5	7.3	0	-
HCM Lane LOS	A	A	-	B	C	A	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.2	1	0	0	-	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	286	195	145	42	28	107
Future Volume (vph)	286	195	145	42	28	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125	0		0	0	
Storage Lanes	1	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.970			
Flt Protected	0.950					0.990
Satd. Flow (prot)	1770	1583	1807	0	0	1775
Flt Permitted	0.950					0.990
Satd. Flow (perm)	1770	1583	1807	0	0	1775
Link Speed (mph)	25		55			55
Link Distance (ft)	263		258			236
Travel Time (s)	7.2		3.2			2.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	6%	6%
Adj. Flow (vph)	311	212	158	46	30	116
Shared Lane Traffic (%)						
Lane Group Flow (vph)	311	212	204	0	0	146
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 43.2%		ICU Level of Service A	
Analysis Period (min) 15			

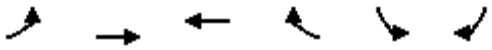
Intersection	
Int Delay, s/veh	8.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	286	195	145	42	28	107
Future Vol, veh/h	286	195	145	42	28	107
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	6	6
Mvmt Flow	311	212	158	46	30	116

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	357	181	0	0	204	0
Stage 1	181	-	-	-	-	-
Stage 2	176	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.16	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.254	-
Pot Cap-1 Maneuver	641	862	-	-	1344	-
Stage 1	850	-	-	-	-	-
Stage 2	855	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	626	862	-	-	1344	-
Mov Cap-2 Maneuver	626	-	-	-	-	-
Stage 1	830	-	-	-	-	-
Stage 2	855	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.9	0	1.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	626	862	1344	-
HCM Lane V/C Ratio	-	-	0.497	0.246	0.023	-
HCM Control Delay (s)	-	-	16.3	10.5	7.7	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	2.8	1	0.1	-



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	4	97	263	0	0	203
Future Volume (vph)	4	97	263	0	0	203
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected		0.998				
Satd. Flow (prot)	0	1859	1863	0	1611	0
Flt Permitted		0.998				
Satd. Flow (perm)	0	1859	1863	0	1611	0
Link Speed (mph)		25	25		25	
Link Distance (ft)		267	203		489	
Travel Time (s)		7.3	5.5		13.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	105	286	0	0	221
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	109	286	0	221	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 33.1%		ICU Level of Service A	
Analysis Period (min) 15			

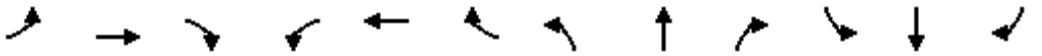
Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	97	263	0	0	203
Future Vol, veh/h	4	97	263	0	0	203
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	105	286	0	0	221

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	286	0	-	0	399	286
Stage 1	-	-	-	-	286	-
Stage 2	-	-	-	-	113	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1276	-	-	-	607	753
Stage 1	-	-	-	-	763	-
Stage 2	-	-	-	-	912	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1276	-	-	-	605	753
Mov Cap-2 Maneuver	-	-	-	-	605	-
Stage 1	-	-	-	-	761	-
Stage 2	-	-	-	-	912	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	11.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1276	-	-	-	753
HCM Lane V/C Ratio	0.003	-	-	-	0.293
HCM Control Delay (s)	7.8	0	-	-	11.8
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	1.2



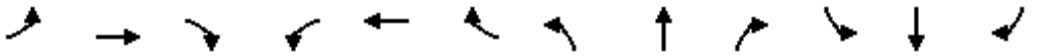
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	15	62	84	144	253	117	222	20	35	170	66
Future Volume (vph)	56	15	62	84	144	253	117	222	20	35	170	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		60	0		45	210		0	85		10
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.962			0.982		0.950			0.950		
Satd. Flow (prot)	0	1792	1583	0	1829	1583	1752	1845	1568	1752	1845	1568
Flt Permitted		0.654			0.848		0.545			0.609		
Satd. Flow (perm)	0	1218	1583	0	1580	1583	1005	1845	1568	1123	1845	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			208			208			208			208
Link Speed (mph)		45			40			45			45	
Link Distance (ft)		899			591			864			643	
Travel Time (s)		13.6			10.1			13.1			9.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	61	16	67	91	157	275	127	241	22	38	185	72
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	77	67	0	248	275	127	241	22	38	185	72
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Free	Perm	NA	Free	pm+pt	NA	Free	pm+pt	NA	Free
Protected Phases		4			8		5	2		1	6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		Free	8		Free	2		Free	6		Free
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		10.0	23.0		9.5	22.5	
Total Split (%)	40.9%	40.9%		40.9%	40.9%		18.2%	41.8%		17.3%	40.9%	
Maximum Green (s)	18.0	18.0		18.0	18.0		5.5	18.5		5.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0			11.0	
Pedestrian Calls (#/hr)	0	0		0	0			0			0	
Act Effct Green (s)		11.7	42.2		11.7	42.2	20.0	18.1	42.2	17.4	13.4	42.2
Actuated g/C Ratio		0.28	1.00		0.28	1.00	0.47	0.43	1.00	0.41	0.32	1.00
v/c Ratio		0.23	0.04		0.57	0.17	0.22	0.31	0.01	0.07	0.32	0.05
Control Delay		13.8	0.0		18.8	0.2	7.7	12.4	0.0	7.0	15.2	0.1
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		13.8	0.0		18.8	0.2	7.7	12.4	0.0	7.0	15.2	0.1
LOS		B	A		B	A	A	B	A	A	B	A
Approach Delay		7.4			9.1			10.2			10.5	
Approach LOS		A			A			B			B	

Intersection Summary

Area Type: Other
Cycle Length: 55
Actuated Cycle Length: 42.2
Natural Cycle: 55
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.57
Intersection Signal Delay: 9.5 Intersection LOS: A
Intersection Capacity Utilization 47.2% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 24: Dollarway Rd & Hoadley Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	15	62	84	144	253	117	222	20	35	170	66
Future Volume (veh/h)	56	15	62	84	144	253	117	222	20	35	170	66
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	61	16	0	91	157	0	127	241	0	38	185	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	3	3	3	3	3	3
Cap, veh/h	483	101		286	262		570	468		498	345	
Arrive On Green	0.22	0.22	0.00	0.22	0.22	0.00	0.11	0.25	0.00	0.05	0.19	0.00
Sat Flow, veh/h	1153	462	1585	503	1197	1585	1767	1856	1572	1767	1856	1572
Grp Volume(v), veh/h	77	0	0	248	0	0	127	241	0	38	185	0
Grp Sat Flow(s),veh/h/ln	1615	0	1585	1700	0	1585	1767	1856	1572	1767	1856	1572
Q Serve(g_s), s	0.0	0.0	0.0	2.6	0.0	0.0	1.5	3.1	0.0	0.5	2.5	0.0
Cycle Q Clear(g_c), s	1.0	0.0	0.0	3.7	0.0	0.0	1.5	3.1	0.0	0.5	2.5	0.0
Prop In Lane	0.79		1.00	0.37		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	584	0		548	0		570	468		498	345	
V/C Ratio(X)	0.13	0.00		0.45	0.00		0.22	0.51		0.08	0.54	
Avail Cap(c_a), veh/h	1147	0		1256	0		719	1229		733	1195	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	8.9	0.0	0.0	9.9	0.0	0.0	7.5	9.0	0.0	8.5	10.3	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.6	0.0	0.0	0.2	0.9	0.0	0.1	1.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.9	0.0	0.0	0.3	0.7	0.0	0.1	0.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.0	0.0	0.0	10.5	0.0	0.0	7.7	9.9	0.0	8.5	11.6	0.0
LnGrp LOS	A	A		B	A		A	A		A	B	
Approach Vol, veh/h		77	A		248	A		368	A		223	A
Approach Delay, s/veh		9.0			10.5			9.1			11.1	
Approach LOS		A			B			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.8	11.6		10.6	7.6	9.7		10.6				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	18.5		18.0	5.5	18.0		18.0				
Max Q Clear Time (g_c+I1), s	2.5	5.1		3.0	3.5	4.5		5.7				
Green Ext Time (p_c), s	0.0	0.9		0.2	0.1	0.7		1.0				

Intersection Summary			
HCM 6th Ctrl Delay		10.0	
HCM 6th LOS		A	

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX C

SMART EVALUATOR RESULTS

Pine Bluff Arsenal
Combined Gate
Scenario 3

An evaluation of the ACP/ECF shown above was conducted to determine the impacts of implementing technology. The option shown below was selected as the preferred scenario. See the attached pages to review the complete results and inputs provided.

Infrastructure Needs

Lanes Needed	Infrastructure Cost	Annualized Infrastructure Cost	Annualized Infrastructure Maintenance Cost
2	$10,000,000	$584,565	$29,228

Expected Congestion

Peak Hour Max Vehicle Queue	Annualized Congestion Cost	Annualized Cost of Wasted Fuel
20	$87,037	$2,658

Manpower Needs

Additional Manpower Needed	Annualized Manpower Cost
1	$184,164

Technology Costs

Technology Cost	Annualized Cost of Technology	Annualized Technology Maintenance Cost
$30,000	$5,261	$106

Emissions

Annual Carbon Monoxide Emissions (g)	Annual Nitrogen Oxide Emissions (g)	Annual Volatile Organic Compound Emissions (g)
937,992	17,009	58,156

Total Annual Costs	$893,019
Risk Score	0.000

B/C Ratios and Level of Service

Traffic Benefit to Cost Ratio	Traffic Level of Service	Safety Benefit to Cost Ratio
3.13	C	N/A

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Pine Bluff Arsenal
Combined Gate
Scenario 3

Design Demand	636 vph	Existing Conditions	Dynamic Conditions	Methods Applied to Existing Lanes		
				Handheld Processing	AIE Processing	
					No Arms	With Arms
Number of Lanes		1		1	1	1
Traffic Queue (vehicles)		81		81	57	75
Additional Manpower Needed						
Infrastructure Cost						
Annualized Infrastructure Cost						
Annualized Infrastructure Maintenance Cost		$21,921		$21,921	$21,921	$21,921
Annualized Congestion Cost		$2,169,844		$2,169,844	$1,141,113	$1,857,167
Annualized Manpower Cost		$92,082		$92,082	$92,082	$92,082
Technology Cost		$15,000		$15,000	$160,000	$160,000
Annualized Technology Cost		$2,631		$2,631	$28,059	$28,059
Annualized Technology Maintenance Cost		$53		$53	$567	$567
Annualized Cost of Wasted Fuel		$66,255		$66,255	$34,843	$56,707
Annual Carbon Monoxide Emissions (g)		23,384,369		23,384,369	12,297,756	20,014,659
Annual Nitrogen Oxide Emissions (g)		424,037		424,037	222,999	362,932
Annual Volatile Organic Compound Emissions (g)		1,449,831		1,449,831	762,461	1,240,909
Crash Reduction Benefit to Cost Ratio		N/A		N/A	N/A	N/A
Traffic Benefit to Cost Ratio		0		0	40.87	12.42
Traffic Level of Service		F		F	F	F
Total Annual Costs		$2,352,786		$2,352,786	$1,318,585	$2,056,503
	Risk Score	0.000		0.000	0.000	0.000

	Methods Applied to Existing Lanes with Added Construction					
	Manual Processing		Handheld Processing		AIE Processing	
	Single	Tandem	Single	Tandem	No Arms	With Arms
Total Lanes Needed	2	2	2	2	2	2
Traffic Queue (vehicles)	12	5	20	8	8	15
Additional Manpower Needed	1	3	1	3	1	1
Infrastructure Cost	$10,000,000	$10,000,000	$10,000,000	$10,000,000	$10,000,000	$10,000,000
Annualized Infrastructure Cost	$584,565	$584,565	$584,565	$584,565	$584,565	$584,565
Annualized Infrastructure Maintenance Cost	$29,228	$29,228	$29,228	$29,228	$29,228	$29,228
Annualized Congestion Cost	$35,260	$20,312	$87,037	$25,702	$25,702	$48,120
Annualized Manpower Cost	$184,164	$368,328	$184,164	$368,328	$184,164	$184,164
Technology Cost	$0	$0	$30,000	$30,000	$320,000	$320,000
Annualized Technology Cost	$0	$0	$5,261	$5,261	$56,118	$56,118
Annualized Technology Maintenance Cost	$0	$0	$106	$106	$1,135	$1,135
Annualized Cost of Wasted Fuel	$1,077	$620	$2,658	$785	$785	$1,469
Annual Carbon Monoxide Emissions (g)	379,997	218,906	937,992	276,991	276,991	518,586
Annual Nitrogen Oxide Emissions (g)	6,891	3,969	17,009	5,023	5,023	9,404
Annual Volatile Organic Compound Emissions (g)	23,560	13,572	58,156	17,173	17,173	32,152
Crash Reduction Benefit to Cost Ratio	N/A	N/A	N/A	N/A	N/A	N/A
Traffic Benefit to Cost Ratio	3.23	2.56	3.13	2.54	2.99	2.96
Traffic Level of Service	B	B	C	B	B	B
Total Annual Costs	$834,294	$1,003,053	$893,019	$1,013,975	$881,697	$904,799
Risk Score	0.000	0.000	0.000	0.000	0.000	0.000

Pine Bluff Arsenal
Combined Gate
Scenario 3

Below are the existing conditions that were used for this evaluation.

Number of Existing Lanes	1
Construction Year	

Existing Manpower, Technology and ID check island traffic volumes

	Existing Manpower	Existing Technology	Traffic Volume at ID Check Islands
Lane 1	1	Handheld	636
Lane 2			
Lane 3			
Lane 4			
Lane 5			
Lane 6			
Lane 7			
Lane 8			

Traffic Queues

Maximum Observed Queue During the Peak Hour	

Crash Data for Inbound Approach Lanes

Number of Crashes Per Year	

Volume Adjustments

Deployment %	
Local Growth %	
Future Growth %	
Peak Hour Factor	1

Design Demand	636

Pine Bluff Arsenal
Dexter Gate
Scenario 2

An evaluation of the ACP/ECF shown above was conducted to determine the impacts of implementing technology. The option shown below was selected as the preferred scenario. See the attached pages to review the complete results and inputs provided.

Infrastructure Needs

Lanes Needed	Infrastructure Cost	Annualized Infrastructure Cost	Annualized Infrastructure Maintenance Cost
2	$10,000,000	$584,565	$29,228

Expected Congestion

Peak Hour Max Vehicle Queue	Annualized Congestion Cost	Annualized Cost of Wasted Fuel
4	$15,798	$482

Manpower Needs

Additional Manpower Needed	Annualized Manpower Cost
0	$184,164

Technology Costs

Technology Cost	Annualized Cost of Technology	Annualized Technology Maintenance Cost
$30,000	$5,261	$106

Emissions

Annual Carbon Monoxide Emissions (g)	Annual Nitrogen Oxide Emissions (g)	Annual Volatile Organic Compound Emissions (g)
170,256	3,087	10,556

Total Annual Costs	$819,604
Risk Score	0.000

B/C Ratios and Level of Service

Traffic Benefit to Cost Ratio	Traffic Level of Service	Safety Benefit to Cost Ratio
0.00	B	N/A

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Pine Bluff Arsenal
Dexter Gate
Scenario 2

Design Demand	384 vph	Existing Conditions	Dynamic Conditions	Methods Applied to Existing Lanes		
				Handheld Processing	AIE Processing	
					No Arms	With Arms
Number of Lanes		2		2	2	2
Traffic Queue (vehicles)		4		4	2	3
Additional Manpower Needed						
Infrastructure Cost						
Annualized Infrastructure Cost						
Annualized Infrastructure Maintenance Cost		$29,228		$29,228	$29,228	$29,228
Annualized Congestion Cost		$15,798		$15,798	$12,176	$14,560
Annualized Manpower Cost		$184,164		$184,164	$184,164	$184,164
Technology Cost		$30,000		$30,000	$320,000	$320,000
Annualized Technology Cost		$5,261		$5,261	$56,118	$56,118
Annualized Technology Maintenance Cost		$106		$106	$1,135	$1,135
Annualized Cost of Wasted Fuel		$482		$482	$372	$445
Annual Carbon Monoxide Emissions (g)		170,256		170,256	131,222	156,914
Annual Nitrogen Oxide Emissions (g)		3,087		3,087	2,379	2,845
Annual Volatile Organic Compound Emissions (g)		10,556		10,556	8,136	9,729
Crash Reduction Benefit to Cost Ratio		N/A		N/A	N/A	N/A
Traffic Benefit to Cost Ratio		0		0	0.07	0.02
Traffic Level of Service		B		B	B	B
Total Annual Costs		$235,039		$235,039	$283,193	$285,650
	Risk Score	0.000		0.000	0.000	0.000

	Methods Applied to Existing Lanes with Added Construction					
	Manual Processing		Handheld Processing		AIE Processing	
	Single	Tandem	Single	Tandem	No Arms	With Arms
Total Lanes Needed	2	1	2	1	1	2
Traffic Queue (vehicles)	3	4	4	8	8	3
Additional Manpower Needed	0	0	0	0	-1	0
Infrastructure Cost	$0	$0	$0	$0	$0	$0
Annualized Infrastructure Cost	$584,565	$0	$584,565	$0	$0	$584,565
Annualized Infrastructure Maintenance Cost	$29,228	$0	$29,228	$0	$0	$29,228
Annualized Congestion Cost	$13,597	$18,598	$15,798	$35,780	$35,780	$14,560
Annualized Manpower Cost	$184,164	$184,164	$184,164	$184,164	$92,082	$184,164
Technology Cost	$0	$0	$30,000	$15,000	$160,000	$320,000
Annualized Technology Cost	$0	$0	$5,261	$2,631	$28,059	$56,118
Annualized Technology Maintenance Cost	$0	$0	$106	$53	$567	$1,135
Annualized Cost of Wasted Fuel	$415	$568	$482	$1,093	$1,093	$445
Annual Carbon Monoxide Emissions (g)	146,530	200,433	170,256	385,597	385,597	156,914
Annual Nitrogen Oxide Emissions (g)	2,657	3,635	3,087	6,992	6,992	2,845
Annual Volatile Organic Compound Emissions (g)	9,085	12,427	10,556	23,907	23,907	9,729
Crash Reduction Benefit to Cost Ratio	N/A	N/A	N/A	N/A	N/A	N/A
Traffic Benefit to Cost Ratio	0.00	0.08	0.00	0.65	0.21	0.00
Traffic Level of Service	B	B	B	C	C	B
Total Annual Costs	$811,969	$203,330	$819,604	$223,721	$157,581	$870,215
Risk Score	0.000	0.000	0.000	0.000	0.000	0.000

Pine Bluff Arsenal
Dexter Gate
Scenario 2

Below are the existing conditions that were used for this evaluation.

Number of Existing Lanes	2
Construction Year	

Existing Manpower, Technology and ID check island traffic volumes

	Existing Manpower	Existing Technology	Traffic Volume at ID Check Islands
Lane 1	1	Handheld	192
Lane 2	1	Handheld	192
Lane 3			
Lane 4			
Lane 5			
Lane 6			
Lane 7			
Lane 8			

Traffic Queues

Maximum Observed Queue During the Peak Hour	

Crash Data for Inbound Approach Lanes

Number of Crashes Per Year	

Volume Adjustments

Deployment %	
Local Growth %	
Future Growth %	
Peak Hour Factor	1

Design Demand	384

Pine Bluff Arsenal
Dexter Gate
Existing Conditions

An evaluation of the ACP/ECF shown above was conducted to determine the impacts of implementing technology. The option shown below was selected as the preferred scenario. See the attached pages to review the complete results and inputs provided.

Infrastructure Needs

Lanes Needed	Infrastructure Cost	Annualized Infrastructure Cost	Annualized Infrastructure Maintenance Cost
1	$0	$0	$0

Expected Congestion

Peak Hour Max Vehicle Queue	Annualized Congestion Cost	Annualized Cost of Wasted Fuel
2	$10,089	$308

Manpower Needs

Additional Manpower Needed	Annualized Manpower Cost
-1	$92,082

Technology Costs

Technology Cost	Annualized Cost of Technology	Annualized Technology Maintenance Cost
$15,000	$2,631	$53

Emissions

Annual Carbon Monoxide Emissions (g)	Annual Nitrogen Oxide Emissions (g)	Annual Volatile Organic Compound Emissions (g)
108,729	1,972	6,741

Total Annual Costs	$105,163
Risk Score	0.000

B/C Ratios and Level of Service

Traffic Benefit to Cost Ratio	Traffic Level of Service	Safety Benefit to Cost Ratio
0.02	B	N/A

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Pine Bluff Arsenal
Dexter Gate
Existing Conditions

Design Demand	200 vph	Existing Conditions	Dynamic Conditions	Methods Applied to Existing Lanes		
				Handheld Processing	AIE Processing	
					No Arms	With Arms
Number of Lanes		2		2	2	2
Traffic Queue (vehicles)		1		1	1	1
Additional Manpower Needed						
Infrastructure Cost						
Annualized Infrastructure Cost						
Annualized Infrastructure Maintenance Cost		$29,228		$29,228	$29,228	$29,228
Annualized Congestion Cost		$7,158		$7,158	$5,917	$6,771
Annualized Manpower Cost		$184,164		$184,164	$184,164	$184,164
Technology Cost		$30,000		$30,000	$320,000	$320,000
Annualized Technology Cost		$5,261		$5,261	$56,118	$56,118
Annualized Technology Maintenance Cost		$106		$106	$1,135	$1,135
Annualized Cost of Wasted Fuel		$219		$219	$181	$207
Annual Carbon Monoxide Emissions (g)		77,139		77,139	63,764	72,969
Annual Nitrogen Oxide Emissions (g)		1,399		1,399	1,156	1,323
Annual Volatile Organic Compound Emissions (g)		4,783		4,783	3,953	4,524
Crash Reduction Benefit to Cost Ratio		N/A		N/A	N/A	N/A
Traffic Benefit to Cost Ratio		0		0	0.02	0.01
Traffic Level of Service		B		B	B	B
Total Annual Costs		$226,136		$226,136	$276,743	$277,623
	Risk Score	0.000		0.000	0.000	0.000

	Methods Applied to Existing Lanes with Added Construction					
	Manual Processing		Handheld Processing		AIE Processing	
	Single	Tandem	Single	Tandem	No Arms	With Arms
Total Lanes Needed	1	1	1	1	1	1
Traffic Queue (vehicles)	2	1	2	1	1	2
Additional Manpower Needed	-1	0	-1	0	-1	-1
Infrastructure Cost	$0	$0	$0	$0	$0	$0
Annualized Infrastructure Cost	$0	$0	$0	$0	$0	$0
Annualized Infrastructure Maintenance Cost	$0	$0	$0	$0	$0	$0
Annualized Congestion Cost	$8,227	$6,101	$10,089	$7,124	$7,124	$9,019
Annualized Manpower Cost	$92,082	$184,164	$92,082	$184,164	$92,082	$92,082
Technology Cost	$0	$0	$15,000	$15,000	$160,000	$160,000
Annualized Technology Cost	$0	$0	$2,631	$2,631	$28,059	$28,059
Annualized Technology Maintenance Cost	$0	$0	$53	$53	$567	$567
Annualized Cost of Wasted Fuel	$251	$186	$308	$218	$218	$275
Annual Carbon Monoxide Emissions (g)	88,663	65,750	108,729	76,778	76,778	97,200
Annual Nitrogen Oxide Emissions (g)	1,608	1,192	1,972	1,392	1,392	1,763
Annual Volatile Organic Compound Emissions (g)	5,497	4,076	6,741	4,760	4,760	6,026
Crash Reduction Benefit to Cost Ratio	N/A	N/A	N/A	N/A	N/A	N/A
Traffic Benefit to Cost Ratio	0.01	0	0.02	0	0	0.02
Traffic Level of Service	B	B	B	B	B	B
Total Annual Costs	$100,560	$190,451	$105,163	$194,190	$128,050	$130,002
Risk Score	0.000	0.000	0.000	0.000	0.000	0.000

Pine Bluff Arsenal
Dexter Gate
Existing Conditions

Below are the existing conditions that were used for this evaluation.

Number of Existing Lanes	2
Construction Year	

Existing Manpower, Technology and ID check island traffic volumes

	Existing Manpower	Existing Technology	Traffic Volume at ID Check Islands
Lane 1	1	Handheld	100
Lane 2	1	Handheld	100
Lane 3			
Lane 4			
Lane 5			
Lane 6			
Lane 7			
Lane 8			

Traffic Queues

Maximum Observed Queue During the Peak Hour	

Crash Data for Inbound Approach Lanes

Number of Crashes Per Year	

Volume Adjustments

Deployment %	
Local Growth %	
Future Growth %	
Peak Hour Factor	1

Design Demand	200

Pine Bluff Arsenal
Plainview Gate
Existing Conditions

An evaluation of the ACP/ECF shown above was conducted to determine the impacts of implementing technology. The option shown below was selected as the preferred scenario. See the attached pages to review the complete results and inputs provided.

Infrastructure Needs

Lanes Needed	Infrastructure Cost	Annualized Infrastructure Cost	Annualized Infrastructure Maintenance Cost
1	$0	$0	$0

Expected Congestion

Peak Hour Max Vehicle Queue	Annualized Congestion Cost	Annualized Cost of Wasted Fuel
4	$17,397	$531

Manpower Needs

Additional Manpower Needed	Annualized Manpower Cost
0	$92,082

Technology Costs

Technology Cost	Annualized Cost of Technology	Annualized Technology Maintenance Cost
$15,000	$2,631	$53

Emissions

Annual Carbon Monoxide Emissions (g)	Annual Nitrogen Oxide Emissions (g)	Annual Volatile Organic Compound Emissions (g)
187,487	3,400	11,624

Total Annual Costs	$112,694
Risk Score	0.000

B/C Ratios and Level of Service

Traffic Benefit to Cost Ratio	Traffic Level of Service	Safety Benefit to Cost Ratio
0.00	B	N/A

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Pine Bluff Arsenal
Plainview Gate
Existing Conditions

Design Demand	252 vph	Existing Conditions	Dynamic Conditions	Methods Applied to Existing Lanes		
				Handheld Processing	AIE Processing	
					No Arms	With Arms
Number of Lanes		1		1	1	1
Traffic Queue (vehicles)		4		4	2	3
Additional Manpower Needed						
Infrastructure Cost						
Annualized Infrastructure Cost						
Annualized Infrastructure Maintenance Cost		$21,921		$21,921	$21,921	$21,921
Annualized Congestion Cost		$17,397		$17,397	$10,140	$14,358
Annualized Manpower Cost		$92,082		$92,082	$92,082	$92,082
Technology Cost		$15,000		$15,000	$160,000	$160,000
Annualized Technology Cost		$2,631		$2,631	$28,059	$28,059
Annualized Technology Maintenance Cost		$53		$53	$567	$567
Annualized Cost of Wasted Fuel		$531		$531	$310	$438
Annual Carbon Monoxide Emissions (g)		187,487		187,487	109,274	154,740
Annual Nitrogen Oxide Emissions (g)		3,400		3,400	1,981	2,806
Annual Volatile Organic Compound Emissions (g)		11,624		11,624	6,775	9,594
Crash Reduction Benefit to Cost Ratio		N/A		N/A	N/A	N/A
Traffic Benefit to Cost Ratio		0		0	0.29	0.12
Traffic Level of Service		B		B	B	B
Total Annual Costs		$134,615		$134,615	$153,079	$157,425
	Risk Score	0.000		0.000	0.000	0.000

	Methods Applied to Existing Lanes with Added Construction					
	Manual Processing		Handheld Processing		AIE Processing	
	Single	Tandem	Single	Tandem	No Arms	With Arms
Total Lanes Needed	1	1	1	1	1	1
Traffic Queue (vehicles)	3	1	4	2	2	3
Additional Manpower Needed	0	1	0	1	0	0
Infrastructure Cost	$0	$0	$0	$0	$0	$0
Annualized Infrastructure Cost	$0	$0	$0	$0	$0	$0
Annualized Infrastructure Maintenance Cost	$0	$0	$0	$0	$0	$0
Annualized Congestion Cost	$12,441	$8,300	$17,397	$10,140	$10,140	$14,358
Annualized Manpower Cost	$92,082	$184,164	$92,082	$184,164	$92,082	$92,082
Technology Cost	$0	$0	$15,000	$15,000	$160,000	$160,000
Annualized Technology Cost	$0	$0	$2,631	$2,631	$28,059	$28,059
Annualized Technology Maintenance Cost	$0	$0	$53	$53	$567	$567
Annualized Cost of Wasted Fuel	$380	$253	$531	$310	$310	$438
Annual Carbon Monoxide Emissions (g)	134,076	89,452	187,487	109,274	109,274	154,740
Annual Nitrogen Oxide Emissions (g)	2,431	1,622	3,400	1,981	1,981	2,806
Annual Volatile Organic Compound Emissions (g)	8,313	5,546	11,624	6,775	6,775	9,594
Crash Reduction Benefit to Cost Ratio	N/A	N/A	N/A	N/A	N/A	N/A
Traffic Benefit to Cost Ratio	0	0.14	0.00	0.11	1.86	0.78
Traffic Level of Service	B	B	B	B	B	B
Total Annual Costs	$104,903	$192,717	$112,694	$197,298	$131,158	$135,504
Risk Score	0.000	0.000	0.000	0.000	0.000	0.000

Pine Bluff Arsenal
Plainview Gate
Existing Conditions

Below are the existing conditions that were used for this evaluation.

Number of Existing Lanes	1
Construction Year	

Existing Manpower, Technology and ID check island traffic volumes

	Existing Manpower	Existing Technology	Traffic Volume at ID Check Islands
Lane 1	1	Handheld	252
Lane 2			
Lane 3			
Lane 4			
Lane 5			
Lane 6			
Lane 7			
Lane 8			

Traffic Queues

Maximum Observed Queue During the Peak Hour	

Crash Data for Inbound Approach Lanes

Number of Crashes Per Year	

Volume Adjustments

Deployment %	
Local Growth %	
Future Growth %	
Peak Hour Factor	1

Design Demand	252

Pine Bluff Arsenal
Plainview Gate
Scenario 2

An evaluation of the ACP/ECF shown above was conducted to determine the impacts of implementing technology. The option shown below was selected as the preferred scenario. See the attached pages to review the complete results and inputs provided.

Infrastructure Needs

Lanes Needed	Infrastructure Cost	Annualized Infrastructure Cost	Annualized Infrastructure Maintenance Cost
1	$0	$0	$0

Expected Congestion

Peak Hour Max Vehicle Queue	Annualized Congestion Cost	Annualized Cost of Wasted Fuel
4	$17,397	$531

Manpower Needs

Additional Manpower Needed	Annualized Manpower Cost
0	$92,082

Technology Costs

Technology Cost	Annualized Cost of Technology	Annualized Technology Maintenance Cost
$15,000	$2,631	$53

Emissions

Annual Carbon Monoxide Emissions (g)	Annual Nitrogen Oxide Emissions (g)	Annual Volatile Organic Compound Emissions (g)
187,487	3,400	11,624

Total Annual Costs	$112,694
Risk Score	0.000

B/C Ratios and Level of Service

Traffic Benefit to Cost Ratio	Traffic Level of Service	Safety Benefit to Cost Ratio
0.00	B	N/A

This form was created by Gannett Fleming, Inc.

Pine Bluff Arsenal
Plainview Gate
Scenario 2

Design Demand	252 vph	Existing Conditions	Dynamic Conditions	Methods Applied to Existing Lanes		
				Handheld Processing	AIE Processing	
					No Arms	With Arms
Number of Lanes		1		1	1	1
Traffic Queue (vehicles)		4		4	2	3
Additional Manpower Needed						
Infrastructure Cost						
Annualized Infrastructure Cost						
Annualized Infrastructure Maintenance Cost		$21,921		$21,921	$21,921	$21,921
Annualized Congestion Cost		$17,397		$17,397	$10,140	$14,358
Annualized Manpower Cost		$92,082		$92,082	$92,082	$92,082
Technology Cost		$15,000		$15,000	$160,000	$160,000
Annualized Technology Cost		$2,631		$2,631	$28,059	$28,059
Annualized Technology Maintenance Cost		$53		$53	$567	$567
Annualized Cost of Wasted Fuel		$531		$531	$310	$438
Annual Carbon Monoxide Emissions (g)		187,487		187,487	109,274	154,740
Annual Nitrogen Oxide Emissions (g)		3,400		3,400	1,981	2,806
Annual Volatile Organic Compound Emissions (g)		11,624		11,624	6,775	9,594
Crash Reduction Benefit to Cost Ratio		N/A		N/A	N/A	N/A
Traffic Benefit to Cost Ratio		0		0	0.29	0.12
Traffic Level of Service		B		B	B	B
Total Annual Costs		$134,615		$134,615	$153,079	$157,425
	Risk Score	0.000		0.000	0.000	0.000

	Methods Applied to Existing Lanes with Added Construction					
	Manual Processing		Handheld Processing		AIE Processing	
	Single	Tandem	Single	Tandem	No Arms	With Arms
Total Lanes Needed	1	1	1	1	1	1
Traffic Queue (vehicles)	3	1	4	2	2	3
Additional Manpower Needed	0	1	0	1	0	0
Infrastructure Cost	$0	$0	$0	$0	$0	$0
Annualized Infrastructure Cost	$0	$0	$0	$0	$0	$0
Annualized Infrastructure Maintenance Cost	$0	$0	$0	$0	$0	$0
Annualized Congestion Cost	$12,441	$8,300	$17,397	$10,140	$10,140	$14,358
Annualized Manpower Cost	$92,082	$184,164	$92,082	$184,164	$92,082	$92,082
Technology Cost	$0	$0	$15,000	$15,000	$160,000	$160,000
Annualized Technology Cost	$0	$0	$2,631	$2,631	$28,059	$28,059
Annualized Technology Maintenance Cost	$0	$0	$53	$53	$567	$567
Annualized Cost of Wasted Fuel	$380	$253	$531	$310	$310	$438
Annual Carbon Monoxide Emissions (g)	134,076	89,452	187,487	109,274	109,274	154,740
Annual Nitrogen Oxide Emissions (g)	2,431	1,622	3,400	1,981	1,981	2,806
Annual Volatile Organic Compound Emissions (g)	8,313	5,546	11,624	6,775	6,775	9,594
Crash Reduction Benefit to Cost Ratio	N/A	N/A	N/A	N/A	N/A	N/A
Traffic Benefit to Cost Ratio	0	0.14	0.00	0.11	1.86	0.78
Traffic Level of Service	B	B	B	B	B	B
Total Annual Costs	$104,903	$192,717	$112,694	$197,298	$131,158	$135,504
Risk Score	0.000	0.000	0.000	0.000	0.000	0.000

Pine Bluff Arsenal
Plainview Gate
Scenario 2

Below are the existing conditions that were used for this evaluation.

Number of Existing Lanes	1
Construction Year	

Existing Manpower, Technology and ID check island traffic volumes

	Existing Manpower	Existing Technology	Traffic Volume at ID Check Islands
Lane 1	1	Handheld	252
Lane 2			
Lane 3			
Lane 4			
Lane 5			
Lane 6			
Lane 7			
Lane 8			

Traffic Queues

Maximum Observed Queue During the Peak Hour	

Crash Data for Inbound Approach Lanes

Number of Crashes Per Year	

Volume Adjustments

Deployment %	
Local Growth %	
Future Growth %	
Peak Hour Factor	1

Design Demand	252

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Pine Bluff Arsenal
Stark Gate
Existing Conditions

An evaluation of the ACP/ECF shown above was conducted to determine the impacts of implementing technology. The option shown below was selected as the preferred scenario. See the attached pages to review the complete results and inputs provided.

Infrastructure Needs

Lanes Needed	Infrastructure Cost	Annualized Infrastructure Cost	Annualized Infrastructure Maintenance Cost
1	$0	$0	$0

Expected Congestion

Peak Hour Max Vehicle Queue	Annualized Congestion Cost	Annualized Cost of Wasted Fuel
2	$8,712	$266

Manpower Needs

Additional Manpower Needed	Annualized Manpower Cost
0	$92,082

Technology Costs

Technology Cost	Annualized Cost of Technology	Annualized Technology Maintenance Cost
$15,000	$2,631	$53

Emissions

Annual Carbon Monoxide Emissions (g)	Annual Nitrogen Oxide Emissions (g)	Annual Volatile Organic Compound Emissions (g)
93,890	1,703	5,821

Total Annual Costs	$103,744
Risk Score	0.000

B/C Ratios and Level of Service

Traffic Benefit to Cost Ratio	Traffic Level of Service	Safety Benefit to Cost Ratio
0.00	B	N/A

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Pine Bluff Arsenal
Stark Gate
Existing Conditions

Design Demand	184 vph	Existing Conditions	Dynamic Conditions	Methods Applied to Existing Lanes		
				Handheld Processing	AIE Processing	
					No Arms	With Arms
Number of Lanes		1		1	1	1
Traffic Queue (vehicles)		2		2	1	2
Additional Manpower Needed						
Infrastructure Cost						
Annualized Infrastructure Cost						
Annualized Infrastructure Maintenance Cost		$21,921		$21,921	$21,921	$21,921
Annualized Congestion Cost		$8,712		$8,712	$6,366	$7,891
Annualized Manpower Cost		$92,082		$92,082	$92,082	$92,082
Technology Cost		$15,000		$15,000	$160,000	$160,000
Annualized Technology Cost		$2,631		$2,631	$28,059	$28,059
Annualized Technology Maintenance Cost		$53		$53	$567	$567
Annualized Cost of Wasted Fuel		$266		$266	$194	$241
Annual Carbon Monoxide Emissions (g)		93,890		93,890	68,601	85,041
Annual Nitrogen Oxide Emissions (g)		1,703		1,703	1,244	1,542
Annual Volatile Organic Compound Emissions (g)		5,821		5,821	4,253	5,273
Crash Reduction Benefit to Cost Ratio		N/A		N/A	N/A	N/A
Traffic Benefit to Cost Ratio		0		0	0.09	0.03
Traffic Level of Service		B		B	B	B
Total Annual Costs		$125,665		$125,665	$149,189	$150,761
	Risk Score	0.000		0.000	0.000	0.000

	Methods Applied to Existing Lanes with Added Construction					
	Manual Processing		Handheld Processing		AIE Processing	
	Single	Tandem	Single	Tandem	No Arms	With Arms
Total Lanes Needed	1	1	1	1	1	1
Traffic Queue (vehicles)	1	1	2	1	1	2
Additional Manpower Needed	0	1	0	1	0	0
Infrastructure Cost	$0	$0	$0	$0	$0	$0
Annualized Infrastructure Cost	$0	$0	$0	$0	$0	$0
Annualized Infrastructure Maintenance Cost	$0	$0	$0	$0	$0	$0
Annualized Congestion Cost	$7,264	$5,504	$8,712	$6,366	$6,366	$7,891
Annualized Manpower Cost	$92,082	$184,164	$92,082	$184,164	$92,082	$92,082
Technology Cost	$0	$0	$15,000	$15,000	$160,000	$160,000
Annualized Technology Cost	$0	$0	$2,631	$2,631	$28,059	$28,059
Annualized Technology Maintenance Cost	$0	$0	$53	$53	$567	$567
Annualized Cost of Wasted Fuel	$222	$168	$266	$194	$194	$241
Annual Carbon Monoxide Emissions (g)	78,288	59,321	93,890	68,601	68,601	85,041
Annual Nitrogen Oxide Emissions (g)	1,420	1,076	1,703	1,244	1,244	1,542
Annual Volatile Organic Compound Emissions (g)	4,854	3,678	5,821	4,253	4,253	5,273
Crash Reduction Benefit to Cost Ratio	N/A	N/A	N/A	N/A	N/A	N/A
Traffic Benefit to Cost Ratio	0	0.05	0.00	0.03	0.60	0.21
Traffic Level of Service	B	B	B	B	B	B
Total Annual Costs	$99,568	$189,836	$103,744	$193,408	$127,268	$128,840
Risk Score	0.000	0.000	0.000	0.000	0.000	0.000

Pine Bluff Arsenal
Stark Gate
Existing Conditions

Below are the existing conditions that were used for this evaluation.

Number of Existing Lanes	1
Construction Year	

Existing Manpower, Technology and ID check island traffic volumes

	Existing Manpower	Existing Technology	Traffic Volume at ID Check Islands
Lane 1	1	Handheld	184
Lane 2			
Lane 3			
Lane 4			
Lane 5			
Lane 6			
Lane 7			
Lane 8			

Traffic Queues

Maximum Observed Queue During the Peak Hour	

Crash Data for Inbound Approach Lanes

Number of Crashes Per Year	

Volume Adjustments

Deployment %	
Local Growth %	
Future Growth %	
Peak Hour Factor	1

Design Demand	184

APPENDIX D

AVB PLACEMENT CALCULATIONS

Pine Bluff Arsenal
Dexter Gate
Proposed - Inbound
High Speed Threat

ADVANCE SPEED DETECTION

Friction	1	Superelevation	0.04
Gravity (ft/s^2)	32.2	Acceleration (ft/s^2)	11.3
Start Speed (mph)	70	Response Time (s)	9.0
Maximum Speed at the ID Check Position (mph)			130

Segment	Type	Length (ft)	Radius (ft)	Grade	Maximum Speed (ft/s)	Maximum Speed (mph)	Segment Time (s)	Cumulative Time (s)
DAC1	Curve	180	3490	0	120.9	82	1.6	-
ADVANCE SPEED DETECTION				ADVANCE SPEED DETECTION		ADVANCE SPEED DETECTION		
DAC1	Curve	258	3490	0	143.0	97	2.0	2.0
DCI1	Tangent	171	-	0	155.9	106	1.1	3.1
			ID CHECK POSITION		ID CHECK POSITION	ID CHECK POSITION		
DIR1	Tangent	185	-	0	168.8	115	1.1	4.2
			POST-ID REJECTION		POST-ID REJECTION	POST-ID REJECTION		
DRB1	Tangent	901	-	0	190.7	130	4.8	9.0
			ACTIVE VEHICLE BARRIERS		ACTIVE VEHICLE BARRIERS	ACTIVE VEHICLE BARRIERS		

Required Response Distance (ft)	1515
Actual Response Distance (ft)	1515
Required Response Time (s)	9.0
Actual Response Time (s)	9.0
Threat Containment Requirement	MET

Formulas for Calculating Velocity	
TANGENTS	$V_{MAX} = (V_o^2 + 2 * a * L)^{½}$
CURVES	$V_{MAX} = [(f+e) * g * R]^{½}$

V_{MAX} = maximum attainable velocity (ft/s)
V_O = initial velocity (ft/s)
a = acceleration of the vehicle (ft/s/s)
L = segment length (ft)
f = coefficient of friction
e = superelevation
g = acceleration due to gravity (ft/s/s)
R = radius (ft)

Formulas for Calculating Time	
TANGENTS	$Time = 2 * L / (V_{MAX} + V_o)$
CURVES	$Time = L / V_{MAX}$

L = segment length (ft)
V_{MAX} = maximum attainable velocity (ft/s)
V_O = initial velocity (ft/s)

Pine Bluff Arsenal

Dexter Gate

Proposed - Inbound

Covert 1 Threat

Friction	1	Superelevation	0.04
Gravity (ft/s^2)	32.2	Acceleration (ft/s^2)	11.3
Start Speed (mph)	25	Response Time (s)	9.0
Maximum Speed at the ID Check Position (mph)			130

Segment	Type	Length (ft)	Radius (ft)	Grade	Maximum Speed (ft/s)	Maximum Speed (mph)	Segment Time (s)	Cumulative Time (s)
			ID CHECK POSITION		ID CHECK POSITION	ID CHECK POSITION		
DIR1	Tangent	185	-	0	74.3	51	3.3	3.3
DRB1	Tangent	901	-	0	160.9	110	7.7	11.0
			ACTIVE VEHICLE BARRIERS		ACTIVE VEHICLE BARRIERS	ACTIVE VEHICLE BARRIERS		

Required Response Distance (ft)	792
Actual Response Distance (ft)	1086
Required Response Time (s)	9.0
Actual Response Time (s)	11.0
Threat Containment Requirement	**MET**

Formulas for Calculating Velocity	
TANGENTS	$V_{MAX} = (V_o^2 + 2 * a * L)^{½}$
CURVES	$V_{MAX} = [(f+e) * g * R]^{½}$

V_{MAX} = maximum attainable velocity (ft/s)

V_O = initial velocity (ft/s)

a = acceleration of the vehicle (ft/s/s)

L = segment length (ft)

f = coefficient of friction

e = superelevation

g = acceleration due to gravity (ft/s/s)

R = radius (ft)

Formulas for Calculating Time	
TANGENTS	$Time = 2 * L / (V_{MAX} + V_o)$
CURVES	$Time = L / V_{MAX}$

L = segment length (ft)

V_{MAX} = maximum attainable velocity (ft/s)

V_O = initial velocity (ft/s)

Pine Bluff Arsenal

Dexter Gate

Proposed - Inbound

Covert 2 Threat

Friction	1	Superelevation	0.04
Gravity (ft/s^2)	32.2	Acceleration (ft/s^2)	11.3
Start Speed (mph)	25	Response Time (s)	7.0
Maximum Speed at the ID Check Position (mph)			130

Segment	Type	Length (ft)	Radius (ft)	Grade	Maximum Speed (ft/s)	Maximum Speed (mph)	Segment Time (s)	Cumulative Time (s)
			ID CHECK POSITION		ID CHECK POSITION	ID CHECK POSITION		
DIR1	Tangent	185	-	0	36.7	25	1.0	-
			POST-ID REJECTION		POST-ID REJECTION	POST-ID REJECTION		
DRB1	Tangent	901	-	0	147.3	100	9.8	9.8
			ACTIVE VEHICLE BARRIERS		ACTIVE VEHICLE BARRIERS	ACTIVE VEHICLE BARRIERS		

Required Response Distance (ft)	719
Actual Response Distance (ft)	1086
Required Response Time (s)	7.0
Actual Response Time (s)	9.8
Threat Containment Requirement	**MET**

Formulas for Calculating Velocity	
TANGENTS	$V_{MAX} = (V_o^2 + 2 * a * L)^{½}$
CURVES	$V_{MAX} = [(f+e) * g * R]^{½}$

V_{MAX} = maximum attainable velocity (ft/s)
V_O = initial velocity (ft/s)
a = acceleration of the vehicle (ft/s/s)
L = segment length (ft)
f = coefficient of friction
e = superelevation
g = acceleration due to gravity (ft/s/s)
R = radius (ft)

Formulas for Calculating Time	
TANGENTS	$Time = 2 * L / (V_{MAX} + V_o)$
CURVES	$Time = L / V_{MAX}$

L = segment length (ft)
V_{MAX} = maximum attainable velocity (ft/s)
V_O = initial velocity (ft/s)

Gannett Fleming

THREAT CALCULATIONS

Pine Bluff Arsenal
Dexter Gate
Proposed - Inbound - Turn
High Speed Threat

ADVANCE SPEED DETECTION

Friction	1	Superelevation	0.04
Gravity (ft/s^2)	32.2	Acceleration (ft/s^2)	11.3
Start Speed (mph)	70	Response Time (s)	9.0
Maximum Speed at the ID Check Position (mph)			130

Segment	Type	Length (ft)	Radius (ft)	Grade	Maximum Speed (ft/s)	Maximum Speed (mph)	Segment Time (s)	Cumulative Time (s)
DAC1	Curve	180	3490	0	120.9	82	1.6	-
ADVANCE SPEED DETECTION				ADVANCE SPEED DETECTION		ADVANCE SPEED DETECTION		
DAC1	Curve	258	3490	0	143.0	97	2.0	2.0
DCI1	Tangent	171	-	0	155.9	106	1.1	3.1
			ID CHECK POSITION	ID CHECK POSITION		ID CHECK POSITION		
DIR1	Tangent	185	-	0	168.8	115	1.1	4.2
			POST-ID REJECTION	POST-ID REJECTION		POST-ID REJECTION		
DRB1	Tangent	6	-	0	169.2	115	0.0	4.2
DRB1 - DECEL	Tangent	462	-	0	79.7	54	3.7	7.9
DRB2	Curve	347	189	0	79.6	54	4.4	12.3
			ACTIVE VEHICLE BARRIERS	ACTIVE VEHICLE BARRIERS		ACTIVE VEHICLE BARRIERS		

Required Response Distance (ft)	1170
Actual Response Distance (ft)	1429
Required Response Time (s)	9.0
Actual Response Time (s)	12.3
Threat Containment Requirement	MET

Formulas for Calculating Velocity	
TANGENTS	$V_{MAX} = (V_o^2 + 2 * a * L)^{½}$
CURVES	$V_{MAX} = [(f+e) * g * R]^{½}$

V_{MAX} = maximum attainable velocity (ft/s)
V_O = initial velocity (ft/s)
a = acceleration of the vehicle (ft/s/s)
L = segment length (ft)
f = coefficient of friction
e = superelevation
g = acceleration due to gravity (ft/s/s)
R = radius (ft)

Formulas for Calculating Time	
TANGENTS	$Time = 2 * L / (V_{MAX} + V_o)$
CURVES	$Time = L / V_{MAX}$

L = segment length (ft)
V_{MAX} = maximum attainable velocity (ft/s)
V_O = initial velocity (ft/s)

Pine Bluff Arsenal

Dexter Gate

Proposed - Inbound - Turn

Covert 1 Threat

Friction	1	Superelevation	0.04
Gravity (ft/s^2)	32.2	Acceleration (ft/s^2)	11.3
Start Speed (mph)	25	Response Time (s)	9.0
Maximum Speed at the ID Check Position (mph)			130

Segment	Type	Length (ft)	Radius (ft)	Grade	Maximum Speed (ft/s)	Maximum Speed (mph)	Segment Time (s)	Cumulative Time (s)
			ID CHECK POSITION		ID CHECK POSITION	ID CHECK POSITION		
DIR1	Tangent	185	-	0	74.3	51	3.3	3.3
DRB1	Tangent	330	-	0	113.9	78	3.5	6.8
DRB1 - DECEL	Tangent	138	-	0	79.6	54	1.4	8.2
DRB2	Curve	347	189	0	79.6	54	4.4	12.6
			ACTIVE VEHICLE BARRIERS		ACTIVE VEHICLE BARRIERS	ACTIVE VEHICLE BARRIERS		

Required Response Distance (ft)	717
Actual Response Distance (ft)	1000
Required Response Time (s)	9.0
Actual Response Time (s)	12.6
Threat Containment Requirement	MET

Formulas for Calculating Velocity	
TANGENTS	$V_{MAX} = (V_o^2 + 2 * a * L)^{½}$
CURVES	$V_{MAX} = [(f+e) * g * R]^{½}$

V_{MAX} = maximum attainable velocity (ft/s)

V_O = initial velocity (ft/s)

a = acceleration of the vehicle (ft/s/s)

L = segment length (ft)

f = coefficient of friction

e = superelevation

g = acceleration due to gravity (ft/s/s)

R = radius (ft)

Formulas for Calculating Time	
TANGENTS	$Time = 2 * L / (V_{MAX} + V_o)$
CURVES	$Time = L / V_{MAX}$

L = segment length (ft)

V_{MAX} = maximum attainable velocity (ft/s)

V_O = initial velocity (ft/s)

Pine Bluff Arsenal

Dexter Gate

Proposed - Inbound - Turn

Covert 2 Threat

Friction	1	Superelevation	0.04
Gravity (ft/s^2)	32.2	Acceleration (ft/s^2)	11.3
Start Speed (mph)	25	Response Time (s)	7.0
Maximum Speed at the ID Check Position (mph)			130

Segment	Type	Length (ft)	Radius (ft)	Grade	Maximum Speed (ft/s)	Maximum Speed (mph)	Segment Time (s)	Cumulative Time (s)
			ID CHECK POSITION		ID CHECK POSITION	ID CHECK POSITION		
DIR1	Tangent	185	-	0	36.7	25	1.0	-
			POST-ID REJECTION		POST-ID REJECTION	POST-ID REJECTION		
DRB1	Tangent	388	-	0	100.6	69	5.7	5.7
DRB1 - DECEL	Tangent	80	-	0	79.1	54	0.9	6.6
DRB2	Curve	347	189	0	79.6	54	4.3	10.9
			ACTIVE VEHICLE BARRIERS		ACTIVE VEHICLE BARRIERS	ACTIVE VEHICLE BARRIERS		

Required Response Distance (ft)	688
Actual Response Distance (ft)	1000
Required Response Time (s)	7.0
Actual Response Time (s)	10.9
Threat Containment Requirement	**MET**

Formulas for Calculating Velocity	
TANGENTS	$V_{MAX} = (V_o^2 + 2 * a * L)^{½}$
CURVES	$V_{MAX} = [(f+e) * g * R]^{½}$

V_{MAX} = maximum attainable velocity (ft/s)
V_O = initial velocity (ft/s)
a = acceleration of the vehicle (ft/s/s)
L = segment length (ft)
f = coefficient of friction
e = superelevation
g = acceleration due to gravity (ft/s/s)
R = radius (ft)

Formulas for Calculating Time	
TANGENTS	$Time = 2 * L / (V_{MAX} + V_o)$
CURVES	$Time = L / V_{MAX}$

L = segment length (ft)
V_{MAX} = maximum attainable velocity (ft/s)
V_O = initial velocity (ft/s)

Pine Bluff Arsenal
Dexter Gate
Proposed - Outbound
High Speed Threat

WRONG WAY DETECTION

Friction	1	Superelevation	0.04
Gravity (ft/s^2)	32.2	Acceleration (ft/s^2)	11.3
Start Speed (mph)	70	Response Time (s)	9.0
Maximum Speed at the ID Check Position (mph)			130

Segment	Type	Length (ft)	Radius (ft)	Grade	Maximum Speed (ft/s)	Maximum Speed (mph)	Segment Time (s)	Cumulative Time (s)
DAC1	Curve	145	1141	0	117.5	80	1.3	-
WRONG WAY DETECTION					WRONG WAY DETECTION	WRONG WAY DETECTION		
DAC1	Curve	130	1141	0	129.4	88	1.1	1.1
DAC2	Curve	80	2958	0	136.2	93	0.6	1.7
DCI1	Curve	96	2958	0	144.0	98	0.7	2.4
DCI2	Curve	71	1541	0	149.5	102	0.5	2.9
			ID CHECK POSITION		ID CHECK POSITION	ID CHECK POSITION		
DIR1	Curve	166	1541	0	161.5	110	1.1	4.0
DIR2	Curve	20	6444	0	162.9	111	0.1	4.1
			POST-ID REJECTION		POST-ID REJECTION	POST-ID REJECTION		
DRB1	Curve	422	6444	0	189.9	130	2.4	6.5
DRB2	Tangent	487	-	0	190.7	130	2.6	9.1
			ACTIVE VEHICLE BARRIERS		ACTIVE VEHICLE BARRIERS	ACTIVE VEHICLE BARRIERS		

Required Response Distance (ft)	1455
Actual Response Distance (ft)	1472
Required Response Time (s)	9.0
Actual Response Time (s)	9.1
Threat Containment Requirement	MET

Formulas for Calculating Velocity	
TANGENTS	$V_{MAX} = (V_o^2 + 2 * a * L)^{½}$
CURVES	$V_{MAX} = [(f+e) * g * R]^{½}$

V_{MAX} = maximum attainable velocity (ft/s)
V_O = initial velocity (ft/s)
a = acceleration of the vehicle (ft/s/s)
L = segment length (ft)
f = coefficient of friction
e = superelevation
g = acceleration due to gravity (ft/s/s)
R = radius (ft)

Formulas for Calculating Time	
TANGENTS	$Time = 2 * L / (V_{MAX} + V_o)$
CURVES	$Time = L / V_{MAX}$

L = segment length (ft)
V_{MAX} = maximum attainable velocity (ft/s)
V_O = initial velocity (ft/s)

Pine Bluff Arsenal

Dexter Gate

Proposed - Outbound

Covert 1 Threat

Friction	1	Superelevation	0.04
Gravity (ft/s^2)	32.2	Acceleration (ft/s^2)	11.3
Start Speed (mph)	25	Response Time (s)	9.0
Maximum Speed at the ID Check Position (mph)			130

Segment	Type	Length (ft)	Radius (ft)	Grade	Maximum Speed (ft/s)	Maximum Speed (mph)	Segment Time (s)	Cumulative Time (s)
			ID CHECK POSITION		ID CHECK POSITION	ID CHECK POSITION		
DIR1	Curve	166	1541	0	71.4	49	3.1	3.1
DIR2	Curve	20	6444	0	74.5	51	0.3	3.4
DRB1	Curve	422	6444	0	122.8	84	4.3	7.7
DRB2	Tangent	487	-	0	161.5	110	3.4	11.1
			ACTIVE VEHICLE BARRIERS		ACTIVE VEHICLE BARRIERS	ACTIVE VEHICLE BARRIERS		

Required Response Distance (ft)	777
Actual Response Distance (ft)	1095
Required Response Time (s)	9.0
Actual Response Time (s)	11.1
Threat Containment Requirement	MET

Formulas for Calculating Velocity	
TANGENTS	$V_{MAX} = (V_o^2 + 2 * a * L)^{½}$
CURVES	$V_{MAX} = [(f+e) * g * R]^{½}$

V_{MAX} = maximum attainable velocity (ft/s)

V_O = initial velocity (ft/s)

a = acceleration of the vehicle (ft/s/s)

L = segment length (ft)

f = coefficient of friction

e = superelevation

g = acceleration due to gravity (ft/s/s)

R = radius (ft)

Formulas for Calculating Time	
TANGENTS	$Time = 2 * L / (V_{MAX} + V_o)$
CURVES	$Time = L / V_{MAX}$

L = segment length (ft)

V_{MAX} = maximum attainable velocity (ft/s)

V_O = initial velocity (ft/s)

Pine Bluff Arsenal

Dexter Gate

Proposed - Outbound

Covert 2 Threat

Friction	1	Superelevation	0.04
Gravity (ft/s^2)	32.2	Acceleration (ft/s^2)	11.3
Start Speed (mph)	25	Response Time (s)	7.0
Maximum Speed at the ID Check Position (mph)			130

Segment	Type	Length (ft)	Radius (ft)	Grade	Maximum Speed (ft/s)	Maximum Speed (mph)	Segment Time (s)	Cumulative Time (s)
			ID CHECK POSITION		ID CHECK POSITION	ID CHECK POSITION		
DIR1	Curve	166	1541	0	36.7	25	0.9	-
DIR2	Curve	20	6444	0	36.7	25	0.1	-
			POST-ID REJECTION		POST-ID REJECTION	POST-ID REJECTION		
DRB1	Curve	422	6444	0	104.3	71	6.0	6.0
DRB2	Tangent	487	-	0	147.9	101	3.9	9.9
			ACTIVE VEHICLE BARRIERS		ACTIVE VEHICLE BARRIERS	ACTIVE VEHICLE BARRIERS		

Required Response Distance (ft)	718
Actual Response Distance (ft)	1095
Required Response Time (s)	7.0
Actual Response Time (s)	9.9
Threat Containment Requirement	**MET**

Formulas for Calculating Velocity	
TANGENTS	$V_{MAX} = (V_o^2 + 2 * a * L)^{½}$
CURVES	$V_{MAX} = [(f+e) * g * R]^{½}$

V_{MAX} = maximum attainable velocity (ft/s)

V_O = initial velocity (ft/s)

a = acceleration of the vehicle (ft/s/s)

L = segment length (ft)

f = coefficient of friction

e = superelevation

g = acceleration due to gravity (ft/s/s)

R = radius (ft)

Formulas for Calculating Time	
TANGENTS	$Time = 2 * L / (V_{MAX} + V_o)$
CURVES	$Time = L / V_{MAX}$

L = segment length (ft)

V_{MAX} = maximum attainable velocity (ft/s)

V_O = initial velocity (ft/s)

Pine Bluff Arsenal

Dexter Gate

Proposed - Outbound - Turn

High Speed Threat

WRONG WAY DETECTION

Friction	1	Superelevation	0.04
Gravity (ft/s^2)	32.2	Acceleration (ft/s^2)	11.3
Start Speed (mph)	70	Response Time (s)	9.0
Maximum Speed at the ID Check Position (mph)			130

Segment	Type	Length (ft)	Radius (ft)	Grade	Maximum Speed (ft/s)	Maximum Speed (mph)	Segment Time (s)	Cumulative Time (s)
DAC1	Curve	145	1141	0	117.5	80	1.3	-
WRONG WAY DETECTION					WRONG WAY DETECTION	WRONG WAY DETECTION		
DAC1	Curve	130	1141	0	129.4	88	1.1	1.1
DAC2	Curve	80	2958	0	136.2	93	0.6	1.7
DCI1	Curve	96	2958	0	144.0	98	0.7	2.4
DCI2	Curve	71	1541	0	149.5	102	0.5	2.9
			ID CHECK POSITION		ID CHECK POSITION	ID CHECK POSITION		
DIR1	Curve	166	1541	0	161.5	110	1.1	4.0
DIR2	Curve	20	6444	0	162.9	111	0.1	4.1
			POST-ID REJECTION		POST-ID REJECTION	POST-ID REJECTION		
DRB1	Curve	40	6444	0	165.7	113	0.2	4.3
DRB1 - DECEL	Curve	382	6444	0	95.0	65	2.9	7.2
DRB2 - DECEL	Tangent	68	-	0	75.9	52	0.8	8.0
DRB3	Curve	328	172	0	75.9	52	4.3	12.3
			ACTIVE VEHICLE BARRIERS		ACTIVE VEHICLE BARRIERS	ACTIVE VEHICLE BARRIERS		

Required Response Distance (ft)	1129
Actual Response Distance (ft)	1381
Required Response Time (s)	9.0
Actual Response Time (s)	12.3
Threat Containment Requirement	MET

Formulas for Calculating Velocity	
TANGENTS	$V_{MAX} = (V_o^2 + 2 * a * L)^{½}$
CURVES	$V_{MAX} = [(f+e) * g * R]^{½}$

V_{MAX} = maximum attainable velocity (ft/s)
V_O = initial velocity (ft/s)
a = acceleration of the vehicle (ft/s/s)
L = segment length (ft)
f = coefficient of friction
e = superelevation
g = acceleration due to gravity (ft/s/s)
R = radius (ft)

Formulas for Calculating Time	
TANGENTS	$Time = 2 * L / (V_{MAX} + V_o)$
CURVES	$Time = L / V_{MAX}$

L = segment length (ft)
V_{MAX} = maximum attainable velocity (ft/s)
V_O = initial velocity (ft/s)

Pine Bluff Arsenal

Dexter Gate

Proposed - Outbound - Turn

Covert 1 Threat

Friction	1	Superelevation	0.04
Gravity (ft/s^2)	32.2	Acceleration (ft/s^2)	11.3
Start Speed (mph)	25	Response Time (s)	9.0
Maximum Speed at the ID Check Position (mph)			130

Segment	Type	Length (ft)	Radius (ft)	Grade	Maximum Speed (ft/s)	Maximum Speed (mph)	Segment Time (s)	Cumulative Time (s)
			ID CHECK POSITION		ID CHECK POSITION	ID CHECK POSITION		
DIR1	Curve	166	1541	0	71.4	49	3.1	3.1
DIR2	Curve	20	6444	0	74.5	51	0.3	3.4
DRB1	Curve	336	6444	0	114.6	78	3.6	7.0
DRB1 - DECEL	Curve	86	6444	0	94.8	65	0.8	7.8
DRB2 - DECEL	Tangent	68	-	0	75.6	52	0.8	8.6
DRB3	Curve	328	172	0	75.9	52	4.3	12.9
			ACTIVE VEHICLE BARRIERS		ACTIVE VEHICLE BARRIERS	ACTIVE VEHICLE BARRIERS		

Required Response Distance (ft)	708
Actual Response Distance (ft)	1004
Required Response Time (s)	9.0
Actual Response Time (s)	12.9
Threat Containment Requirement	MET

Formulas for Calculating Velocity	
TANGENTS	$V_{MAX} = (V_o^2 + 2 * a * L)^{½}$
CURVES	$V_{MAX} = [(f+e) * g * R]^{½}$

V_{MAX} = maximum attainable velocity (ft/s)
V_O = initial velocity (ft/s)
a = acceleration of the vehicle (ft/s/s)
L = segment length (ft)
f = coefficient of friction
e = superelevation
g = acceleration due to gravity (ft/s/s)
R = radius (ft)

Formulas for Calculating Time	
TANGENTS	$Time = 2 * L / (V_{MAX} + V_o)$
CURVES	$Time = L / V_{MAX}$

L = segment length (ft)
V_{MAX} = maximum attainable velocity (ft/s)
V_O = initial velocity (ft/s)

Gannett Fleming

THREAT CALCULATIONS

Pine Bluff Arsenal
Dexter Gate
Proposed - Outbound - Turn
Covert 2 Threat

Friction	1	Superelevation	0.04
Gravity (ft/s^2)	32.2	Acceleration (ft/s^2)	11.3
Start Speed (mph)	25	Response Time (s)	7.0
Maximum Speed at the ID Check Position (mph)			130

Segment	Type	Length (ft)	Radius (ft)	Grade	Maximum Speed (ft/s)	Maximum Speed (mph)	Segment Time (s)	Cumulative Time (s)
			ID CHECK POSITION		ID CHECK POSITION	ID CHECK POSITION		
DIR1	Curve	166	1541	0	36.7	25	0.9	-
DIR2	Curve	20	6444	0	36.7	25	0.1	-
			POST-ID REJECTION		POST-ID REJECTION	POST-ID REJECTION		
DRB1	Curve	395	6444	0	101.3	69	5.7	5.7
DRB1 - DECEL	Curve	27	6444	0	94.7	65	0.3	6.0
DRB2 - DECEL	Tangent	68	-	0	75.4	51	0.8	6.8
DRB3	Curve	328	172	0	75.9	52	4.3	11.1
			ACTIVE VEHICLE BARRIERS		ACTIVE VEHICLE BARRIERS	ACTIVE VEHICLE BARRIERS		

Required Response Distance (ft)	694
Actual Response Distance (ft)	1004
Required Response Time (s)	7.0
Actual Response Time (s)	11.1
Threat Containment Requirement	**MET**

Formulas for Calculating Velocity	
TANGENTS	$V_{MAX} = (V_o^2 + 2 * a * L)^{½}$
CURVES	$V_{MAX} = [(f+e) * g * R]^{½}$

V_{MAX} = maximum attainable velocity (ft/s)
V_O = initial velocity (ft/s)
a = acceleration of the vehicle (ft/s/s)
L = segment length (ft)
f = coefficient of friction
e = superelevation
g = acceleration due to gravity (ft/s/s)
R = radius (ft)

Formulas for Calculating Time	
TANGENTS	$Time = 2 * L / (V_{MAX} + V_o)$
CURVES	$Time = L / V_{MAX}$

L = segment length (ft)
V_{MAX} = maximum attainable velocity (ft/s)
V_O = initial velocity (ft/s)

Gannett Fleming

THREAT CALCULATIONS

Pine Bluff
Stark Gate
Proposed - Inbound
High Speed Threat

Friction	1	Superelevation	0.04
Gravity (ft/s^2)	32.2	Acceleration (ft/s^2)	11.3
Start Speed (mph)	70	Response Time (s)	9.0
Maximum Speed at the ID Check Position (mph)			130

Segment	Type	Length (ft)	Radius (ft)	Grade	Maximum Speed (ft/s)	Maximum Speed (mph)	Segment Time (s)	Cumulative Time (s)
DAC1	Tangent	154	-	0	118.4	81	1.4	-
DAC2	Curve	88	601	0	126.5	86	0.7	-
DCI1	Curve	39	601	0	130.0	89	0.3	-
DCI2	Tangent	23	-	0	132.0	90	0.2	-
			ID CHECK POSITION		ID CHECK POSITION	ID CHECK POSITION		
DIR1	Tangent	238	-	0	151.0	103	1.7	1.7
DIR1 - DECEL	Tangent	25	-	0	146.9	100	0.2	1.9
DIR2	Curve	36	641	0	146.5	100	0.2	2.1
DIR2 - DECEL	Curve	36	641	0	140.5	96	0.3	2.4
			POST-ID REJECTION		POST-ID REJECTION	POST-ID REJECTION		
DRB1	Curve	203	641	0	99.7	68	1.7	4.1
DRB2	Curve	275	294	0	99.2	68	2.8	6.9
DRB3	Curve	181	348	0	108.0	74	1.7	8.6
DRB4	Curve	46	1287	0	112.7	77	0.4	9.0
			ACTIVE VEHICLE BARRIERS		ACTIVE VEHICLE BARRIERS	ACTIVE VEHICLE BARRIERS		

Required Response Distance (ft)	1038
Actual Response Distance (ft)	1040
Required Response Time (s)	9.0
Actual Response Time (s)	9.0
Threat Containment Requirement	**MET**

Formulas for Calculating Velocity	
TANGENTS	$V_{MAX} = (V_o^2 + 2 * a * L)^{½}$
CURVES	$V_{MAX} = [(f+e) * g * R]^{½}$

V_{MAX} = maximum attainable velocity (ft/s)
V_O = initial velocity (ft/s)
a = acceleration of the vehicle (ft/s/s)
L = segment length (ft)
f = coefficient of friction
e = superelevation
g = acceleration due to gravity (ft/s/s)
R = radius (ft)

Formulas for Calculating Time	
TANGENTS	$Time = 2 * L / (V_{MAX} + V_o)$
CURVES	$Time = L / V_{MAX}$

L = segment length (ft)
V_{MAX} = maximum attainable velocity (ft/s)
V_O = initial velocity (ft/s)

Pine Bluff

Stark Gate

Proposed - Inbound

Covert 1 Threat

Friction	1	Superelevation	0.04
Gravity (ft/s^2)	32.2	Acceleration (ft/s^2)	11.3
Start Speed (mph)	25	Response Time (s)	9.0
Maximum Speed at the ID Check Position (mph)			130

Segment	Type	Length (ft)	Radius (ft)	Grade	Maximum Speed (ft/s)	Maximum Speed (mph)	Segment Time (s)	Cumulative Time (s)
			ID CHECK POSITION		ID CHECK POSITION	ID CHECK POSITION		
DIR1	Tangent	263	-	0	85.4	58	4.3	4.3
DIR2	Curve	72	641	0	94.4	64	0.8	5.1
DRB1	Curve	153	641	0	111.2	76	1.5	6.6
DRB1 - DECEL	Curve	50	641	0	99.8	68	0.5	7.1
DRB2	Curve	275	294	0	99.2	68	2.8	9.9
DRB3	Curve	181	348	0	108.0	74	1.7	11.6
DRB4	Curve	46	1287	0	112.7	77	0.4	12.0
			ACTIVE VEHICLE BARRIERS		ACTIVE VEHICLE BARRIERS	ACTIVE VEHICLE BARRIERS		

Required Response Distance (ft)	727
Actual Response Distance (ft)	1040
Required Response Time (s)	9.0
Actual Response Time (s)	12.0
Threat Containment Requirement	MET

Formulas for Calculating Velocity	
TANGENTS	$V_{MAX} = (V_o^2 + 2 * a * L)^{½}$
CURVES	$V_{MAX} = [(f+e) * g * R]^{½}$

V_{MAX} = maximum attainable velocity (ft/s)
V_O = initial velocity (ft/s)
a = acceleration of the vehicle (ft/s/s)
L = segment length (ft)
f = coefficient of friction
e = superelevation
g = acceleration due to gravity (ft/s/s)
R = radius (ft)

Formulas for Calculating Time	
TANGENTS	$Time = 2 * L / (V_{MAX} + V_o)$
CURVES	$Time = L / V_{MAX}$

L = segment length (ft)
V_{MAX} = maximum attainable velocity (ft/s)
V_O = initial velocity (ft/s)

Gannett Fleming

THREAT CALCULATIONS

Pine Bluff
Stark Gate
Proposed - Inbound
Covert 2 Threat

Friction	1	Superelevation	0.04
Gravity (ft/s^2)	32.2	Acceleration (ft/s^2)	11.3
Start Speed (mph)	25	Response Time (s)	7.0
Maximum Speed at the ID Check Position (mph)			130

Segment	Type	Length (ft)	Radius (ft)	Grade	Maximum Speed (ft/s)	Maximum Speed (mph)	Segment Time (s)	Cumulative Time (s)
			ID CHECK POSITION		ID CHECK POSITION	ID CHECK POSITION		
DIR1	Tangent	263	-	0	36.7	25	1.4	-
DIR2	Curve	72	641	0	36.7	25	0.5	-
			POST-ID REJECTION		POST-ID REJECTION	POST-ID REJECTION		
DRB1	Curve	203	641	0	77.0	53	3.6	3.6
DRB2	Curve	275	294	0	99.2	68	3.0	6.6
DRB3	Curve	181	348	0	108.0	74	1.7	8.3
DRB4	Curve	46	1287	0	112.7	77	0.4	8.7
			ACTIVE VEHICLE BARRIERS		ACTIVE VEHICLE BARRIERS	ACTIVE VEHICLE BARRIERS		

Required Response Distance (ft)	854
Actual Response Distance (ft)	1040
Required Response Time (s)	7.0
Actual Response Time (s)	8.7
Threat Containment Requirement	**MET**

Formulas for Calculating Velocity	
TANGENTS	$V_{MAX} = (V_o^2 + 2 * a * L)^{½}$
CURVES	$V_{MAX} = [(f+e) * g * R]^{½}$

V_{MAX} = maximum attainable velocity (ft/s)
V_O = initial velocity (ft/s)
a = acceleration of the vehicle (ft/s/s)
L = segment length (ft)
f = coefficient of friction
e = superelevation
g = acceleration due to gravity (ft/s/s)
R = radius (ft)

Formulas for Calculating Time	
TANGENTS	$Time = 2 * L / (V_{MAX} + V_o)$
CURVES	$Time = L / V_{MAX}$

L = segment length (ft)
V_{MAX} = maximum attainable velocity (ft/s)
V_O = initial velocity (ft/s)

Gannett Fleming

THREAT CALCULATIONS

Pine Bluff
Stark Gate
Proposed - Outbound
High Speed Threat

WRONG WAY DETECTION

Friction	1	Superelevation	0.04
Gravity (ft/s^2)	32.2	Acceleration (ft/s^2)	11.3
Start Speed (mph)	70	Response Time (s)	9.0
Maximum Speed at the ID Check Position (mph)			130

Segment	Type	Length (ft)	Radius (ft)	Grade	Maximum Speed (ft/s)	Maximum Speed (mph)	Segment Time (s)	Cumulative Time (s)
DAC1	Tangent	223	-	0	124.8	85	2.0	-
DAC2	Curve	31	618	0	127.6	87	0.2	-
		WRONG WAY DETECTION			WRONG WAY DETECTION	WRONG WAY DETECTION		
DCI1	Curve	61	618	0	132.9	91	0.5	0.5
			ID CHECK POSITION		ID CHECK POSITION	ID CHECK POSITION		
DIR1	Curve	150	618	0	143.9	98	1.1	1.6
DIR1 - DECEL	Curve	25	618	0	139.6	95	0.2	1.8
DIR2 - DECEL	Tangent	95	-	0	122.1	83	0.7	2.5
DIR3	Curve	76	448	0	122.5	84	0.6	3.1
			POST-ID REJECTION		POST-ID REJECTION	POST-ID REJECTION		
DRB1	Curve	73	448	0	122.5	84	0.6	3.7
DRB1 - DECEL	Curve	28	448	0	116.8	80	0.2	3.9
DRB2	Curve	392	406	0	116.6	80	3.4	7.3
DRB3	Curve	178	412	0	117.5	80	1.5	8.8
DRB4	Curve	34	1400	0	120.7	82	0.3	9.1
			ACTIVE VEHICLE BARRIERS		ACTIVE VEHICLE BARRIERS	ACTIVE VEHICLE BARRIERS		

Required Response Distance (ft)	1102
Actual Response Distance (ft)	1112
Required Response Time (s)	9.0
Actual Response Time (s)	9.1
Threat Containment Requirement	MET

Formulas for Calculating Velocity	
TANGENTS	$V_{MAX} = (V_o^2 + 2 * a * L)^{½}$
CURVES	$V_{MAX} = [(f+e) * g * R]^{½}$

V_{MAX} = maximum attainable velocity (ft/s)
V_O = initial velocity (ft/s)
a = acceleration of the vehicle (ft/s/s)
L = segment length (ft)
f = coefficient of friction
e = superelevation
g = acceleration due to gravity (ft/s/s)
R = radius (ft)

Formulas for Calculating Time	
TANGENTS	$Time = 2 * L / (V_{MAX} + V_o)$
CURVES	$Time = L / V_{MAX}$

L = segment length (ft)
V_{MAX} = maximum attainable velocity (ft/s)
V_O = initial velocity (ft/s)

Pine Bluff

Stark Gate

Proposed - Outbound

Covert 1 Threat

Friction	1	Superelevation	0.04
Gravity (ft/s^2)	32.2	Acceleration (ft/s^2)	11.3
Start Speed (mph)	25	Response Time (s)	9.0
Maximum Speed at the ID Check Position (mph)			130

Segment	Type	Length (ft)	Radius (ft)	Grade	Maximum Speed (ft/s)	Maximum Speed (mph)	Segment Time (s)	Cumulative Time (s)
			ID CHECK POSITION		ID CHECK POSITION	ID CHECK POSITION		
DIR1	Curve	175	618	0	72.8	50	3.2	3.2
DIR2	Tangent	95	-	0	86.3	59	1.2	4.4
DIR3	Curve	76	448	0	95.7	65	0.8	5.2
DRB1	Curve	101	448	0	107.0	73	1.0	6.2
DRB2	Curve	392	406	0	116.6	80	3.3	9.5
DRB3	Curve	178	412	0	117.5	80	1.5	11.0
DRB4	Curve	34	1400	0	120.7	82	0.3	11.3
			ACTIVE VEHICLE BARRIERS		ACTIVE VEHICLE BARRIERS	ACTIVE VEHICLE BARRIERS		

Required Response Distance (ft)	775
Actual Response Distance (ft)	1051
Required Response Time (s)	9.0
Actual Response Time (s)	11.3
Threat Containment Requirement	**MET**

Formulas for Calculating Velocity	
TANGENTS	$V_{MAX} = (V_o^2 + 2 * a * L)^{½}$
CURVES	$V_{MAX} = [(f+e) * g * R]^{½}$

V_{MAX} = maximum attainable velocity (ft/s)
V_O = initial velocity (ft/s)
a = acceleration of the vehicle (ft/s/s)
L = segment length (ft)
f = coefficient of friction
e = superelevation
g = acceleration due to gravity (ft/s/s)
R = radius (ft)

Formulas for Calculating Time	
TANGENTS	$Time = 2 * L / (V_{MAX} + V_o)$
CURVES	$Time = L / V_{MAX}$

L = segment length (ft)
V_{MAX} = maximum attainable velocity (ft/s)
V_O = initial velocity (ft/s)

Pine Bluff

Stark Gate

Proposed - Outbound

Covert 2 Threat

Friction	1	Superelevation	0.04
Gravity (ft/s^2)	32.2	Acceleration (ft/s^2)	11.3
Start Speed (mph)	25	Response Time (s)	7.0
Maximum Speed at the ID Check Position (mph)			130

Segment	Type	Length (ft)	Radius (ft)	Grade	Maximum Speed (ft/s)	Maximum Speed (mph)	Segment Time (s)	Cumulative Time (s)
			ID CHECK POSITION		ID CHECK POSITION	ID CHECK POSITION		
DIR1	Curve	175	618	0	36.7	25	1.2	-
DIR2	Tangent	95	-	0	36.7	25	0.5	-
DIR3	Curve	76	448	0	36.7	25	0.6	-
			POST-ID REJECTION		POST-ID REJECTION	POST-ID REJECTION		
DRB1	Curve	101	448	0	60.2	41	2.1	2.1
DRB2	Curve	392	406	0	111.7	76	4.6	6.7
DRB3	Curve	178	412	0	117.5	80	1.5	8.2
DRB4	Curve	34	1400	0	120.7	82	0.3	8.5
			ACTIVE VEHICLE BARRIERS		ACTIVE VEHICLE BARRIERS	ACTIVE VEHICLE BARRIERS		

Required Response Distance (ft)	873
Actual Response Distance (ft)	1051
Required Response Time (s)	7.0
Actual Response Time (s)	8.5
Threat Containment Requirement	MET

Formulas for Calculating Velocity	
TANGENTS	$V_{MAX} = (V_o^2 + 2 * a * L)^{½}$
CURVES	$V_{MAX} = [(f+e) * g * R]^{½}$

V_{MAX} = maximum attainable velocity (ft/s)
V_O = initial velocity (ft/s)
a = acceleration of the vehicle (ft/s/s)
L = segment length (ft)
f = coefficient of friction
e = superelevation
g = acceleration due to gravity (ft/s/s)
R = radius (ft)

Formulas for Calculating Time	
TANGENTS	Time = $2 * L / (V_{MAX} + V_o)$
CURVES	Time = L / V_{MAX}

L = segment length (ft)
V_{MAX} = maximum attainable velocity (ft/s)
V_O = initial velocity (ft/s)

APPENDIX E

COST ESTIMATES

Gannett Fleming
ENGINEERS AND PLANNERS

BASE	Pine Bluff Arsenal	**SHEET NO.**	1 of 1	**JOB NO.**	60792
PROJECT	Center Gate	**BY**	CMC	**DATE**	8/6/2018
SUBJECT	Cost Estimate	**CHECKED**	EMC	**DATE**	8/7/2018

DESCRIPTION	UM	QUAN.	UNIT COST	TOTAL
COMMON EXCAVATION INCLUDING LOADING AND HAULING	CY	27	$4.70	$126.90
12IN CHC DRIVEWAY SECTION	SY	37	$11.00	$407.00
8IN CHC PARKING AREA SLAB	SY	37	$36.00	$1,332.00
4IN CHC PARKING AREA JOINTER	SY	37	$17.00	$629.00
2IN CHC PARKING AREA PAVERING	SY	37	$11.00	$407.00
		SUBTOTAL		**$2,901.90**

REMOVE AND REPLACE ITEMS CALCULATE AS A PERCENTAGE OF SUBTOTAL ABOVE					
REMOVE HEADWALL		LS			
SAWING AND REMOVING	20.0				$730.00
ESC CONTROL	3.0				$90.00
MAINTENANCE AND PROTECTION OF TRAFFIC	3.0				$90.00
TRENCH	10.0				$440.00
BACKFILL	10.0				$440.00
CLEARING AND GRUBBING		LS			
LANDSCAPING	2.0				$70.00
		SUBTOTAL			**$1,860.00**

REMOVE AND SUBTOTAL	**$4,761.90**

NEW REPLACEMENT ITEMS					
ACTIVE VEHICLE BARRIERS	EA	2	$140,000.00	$280,000.00
PASSIVE VEHICLE BARRIERS	LF	2421	$230.00	$556,830.00
BARRIER OVER CH PIT AND JUNCTION BOX	EA	1	$2,700.00	$2,700.00
SLOPING WALL TYPE, 8IN HIGH, TP OF 18IN PENETRATING, IN CONCRETE	LF	34	$170.00	$2,780.00
FENCE GATE PER LEAF OMER SIZE	EA	1	$1,900.00	$1,900.00
DIESEL GENERATOR AND SWITCHGEAR	EA	1	$6,000.00	$6,000.00
PAVEMENT OVERSPEED DETECTION AND WARNING SYSTEM	LS	1	$2,100.00	$2,100.00
ARMED GUARD DETECTION IN 2 LOCATIONS IN DIRECTION LANES	LS	1	$11,000.00	$11,000.00
ONE ZONE 1C CONTROL SYSTEM OVERSPEED DETECTION AND LANES	LS	1	$9,400.00	$9,400.00
CONCRETE, INSPECTION AREA, CRACKS	SY	649	$81.00	$52,569.00
		SUBTOTAL		**$984,279.00**

GRAND SUBTOTAL	**$989,040.90**

ITEMS CALCULATED AS A PERCENTAGE OF THE SUBTOTAL ABOVE					
CONTINGENCY	20.0				$990.00
INSURANCE AND BONDING	2.0				$100.00
ENGINEERING	10.0				$480.00
INSPECTION	10.0				$480.00
MOBILIZATION	5.0				$240.00
		SUBTOTAL			**$2,250.00**

TOTAL	$991,290.90

TOTAL (ROUNDED)	**$1,000,000.00**

NOTES:
Most costs are from RSMeans Heavy Construction Cost Data or the Protective Design Center
Does not include costs related to environmental mitigation that may be required

Gannett Fleming	**BASE**	Pine □luff □rsenal	**SHEET NO.**	1 of 1	**JOB NO.**	60792
EN□ □NEERS □N□ PL□NNERS	**PROJECT**	Stark □ate □nterim □term	**BY**	CM□	**DATE**	8/6/2018
	SUBJECT	Cost Estimate	**CHECKED**	EM□	**DATE**	8/7/2018

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			S□□□□ □□L	**$283,794.80**

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□□ □□L	□1,229,068.80

TOTAL (ROUNDED)	**$1,300,000.00**

N□ □ES:

Most costs are from RSMeans Heavy Construction Cost Data or the Protective Design Center
Does not include costs related to environmental mitigation that may be required

APPENDIX F

CADD FILES

(Electronic Copy Only)

APPENDIX G

PROJECT CORRESPONDENCE

Pine Bluff Arsenal
Entry Control Facility Study
Inbrief Meeting Minutes

□□:	Mark Metil, □annett □leming □nc.
□ate of Meeting:	26 □ebruar□ 2018 □900 hrs
Project:	Pine □luff □rsenal Entr□ Control □acilit□ Stud□
Project Location:	Pine □luff, □rkansas
Subject:	□nbrief Meeting

□he follo□ing □ere in attendance:

Name	Organization	Phone	Email
Mark Metil	□annett □leming	717□64□□0128	mmetil@gfnet.com
Cor□ □loom	□annett □leming	717□836□9264	cbloom@gfnet.com
Mike McCormack	P□□□□P□	870□□40□3301	michael.j.mccormack12.ci□@mail.mil
Stephen Redman	P□□□□P□	870□□40□2834	stephen.d.redman2.ci□@mail.mil
□im □o□	P□□□□P□	870□□40□3132	timoth□h.fo□ci□@mail.mil
Mark □hroneberr□	□P□ □□ □M □i□	870□□40□3244	mark.□.throneberr□ci□@mail.mil
Shane □. Hubanks	P□□□□LE□S	870□□40□3218	shane.a.hubanks.ci□@mail.mil
□imoth□L. Mc□aniel	□LE□S	870□□40□3499	timoth□l.mcdaniel4.ci□@mail.mil
John □ ebber	□LE□S	870□□40□3497	john.□.□ebber2.ci□@mail.mil

□he purpose of the meeting □as to discuss the stud□ scope of □ork, goals, outcomes, and schedule. Mark Metil briefed from a prepared presentation. □n addition, the follo□ing items □ere discussed:

- □ntersection counts should be conducted during the follo□ing timeframes:
  - Plain□ie□ □ate
    - □M:0□4□□0800, M□□:1100□1330, PM:1600□1730
  - □e□ter □ate
    - □M:0□30□0730, M□□:1100□1330, PM:1□4□□171□
  - Stark □ate
    - □M:0□30□0800, M□□:1100□1300, PM:1□00□1700

- □he e□ternal intersection □ill be changed to the intersection of □ollar□a□Road and Hoadle□ Road as re□uested b□the installation
- □e□ter □ate is the onl□gate that accepts truck traffic
  - P□Vs can enter the base from an□gate
- □rucks are escorted throughout the base if the□contain ammunition and arms
- □here is no deplo□ment at the current time □the□t□picall□do not ha□e deplo□ments□
- □he installation □ants to con□ert the Plain□ie□ □ate into the commercial □ehicle gate and make the □e□ter □ate just accept P□V traffic
  - □im □o□is to pro□ide the master plan for the installation

Please Note:

The above meeting synopsis represents the major discussion points and agreements. Should anyone have any additions, modifications, or corrections, please submit them in writing to Mark Metil at mmetil@gfnet.com within five working days of the date of issuance of these meeting minutes. Should no additions be received within ten working days, these minutes will stand as the official minutes and will be duly incorporated into the project files.

SDDC

MILITARY SURFACE DEPLOYMENT & DISTRIBUTION COMMAND

"SURFACE WARRIORS"

SDDC MOVES AND SUSTAINS FORCES, MATERIEL, AND FAMILIES ACROSS THE NATION AND AROUND THE GLOBE.

TRAFFIC ENGINEERING AND SAFETY STUDIES FOR AN ACCESS CONTROL POINT STUDY

Pine Bluff Arsenal, Arkansas

Mark Metil, P.E., PTOE

Gannett Fleming, Inc.

26 February 2018

WE ARE THE U.S. ARMY SERVICE COMPONENT COMMAND OF THE U.S. TRANSPORTATION COMMAND AND A MAJOR SUBORDINATE COMMAND OF THE U.S. ARMY MATERIEL COMMAND

U.S.ARMY

TRUSTED PROFESSIONALS...DELIVERING READINESS!

Agenda

- Introduction
- Authority of MUTCD
- Study Goals
- Study Activities
- Access Control Points Reference Documents
- ACP Overview
- Data Requests
- Next Steps

Introduction: SDDCTEA

Organization and Mission:	U.S. Army Military Surface Deployment and Distribution Command Transportation Engineering Agency (SDDCTEA) Traffic Engineering Branch *Our mission is to improve highway safety and reduce traffic congestion on DoD installation roads and on routes providing access to installations.*
Address:	1 Soldier Way, Scott AFB, IL 62225-5006
Points of Contact:	Mike Carda, P.E., PTOE: 618-220-5450 email: mickeal.d.carda.civ@mail.mil Jason Cowin, P.E.: Branch Chief: 618-220-5218 email: jason.w.cowin.civ@mail.mil Organizational email: army.sddc.safb.traffic@mail.mil
Fax:	Commercial: 618-220-5125
Webpage:	http://www.sddc.army.mil/sites/tea Sign up for mailing list on: http://www.sddc.army.mil/sites/TEA/Functions/SpecialAssistant/TrafficEngineeringBranch/Pages/default.aspx

Introduction: SDDCTEA Services & Products

- Traffic engineering studies:
  - In-house and contracted
  - Have 30 – 40 studies ongoing at any one time for all branches of the military
- Produce and distribute multiple pamphlets
- Produce and distribute 4 - 5 bulletins per year for 2,000+ contacts
- Host 3-4 traffic engineering workshops annually, regarding traffic engineering and safety along roadways, at intersections, and at Access Control Points (ACPs)
- Develop software for "right-sizing" gates and to assist with other traffic engineering calculations
- SDDCTEA publications/bulletins can be found on their website - http://www.sddc.army.mil/sites/TEA/Functions/SpecialAssistant/TrafficEngineeringBranch/Pages/default.aspx
- Created DoD Supplement to the MUTCD - http://www.sddc.army.mil/sites/TEA/Functions/SpecialAssistant/TrafficEngineeringBranch/Documents/MUTCD_DOD_Supplement_Revision_20150601.pdf

Introduction: Gannett Fleming

- International multi-disciplinary engineering firm established in 1915
  - Headquarters in Camp Hill, PA
  - 50+ offices
  - Have provided A/E support to SDDCTEA for 15 years including over 50 comprehensive studies, over 400 ACP assessments, 30 sign management systems, and numerous traffic engineering and safety studies
- Assisted in the development of the following materials:
  - SDDCTEA 55-8, Traffic Engineering Studies Reference
  - SDDCTEA Pamphlet 55-15, Traffic and Safety Engineering for Better Entry Control Facilities
  - SDDCTEA Pamphlet 55-17, Better Military Traffic Engineering
  - Department of the Army, The Army Standard (AS) for Access Control Points (ACPs)

Gannett Fleming

Gannett Fleming
207 Senate Avenue
Camp Hill, PA 17011
(717) 763-7211

Study Team:
Mark Metil, P.E., PTOE
Email: mmetil@gfnet.com
Office: 717-763-7212 2321
Cell: 717-645-0128

Cory Bloom, EIT
Marissa Metil

Introduction: Installation Point of Contact

Mr. Tim Fox

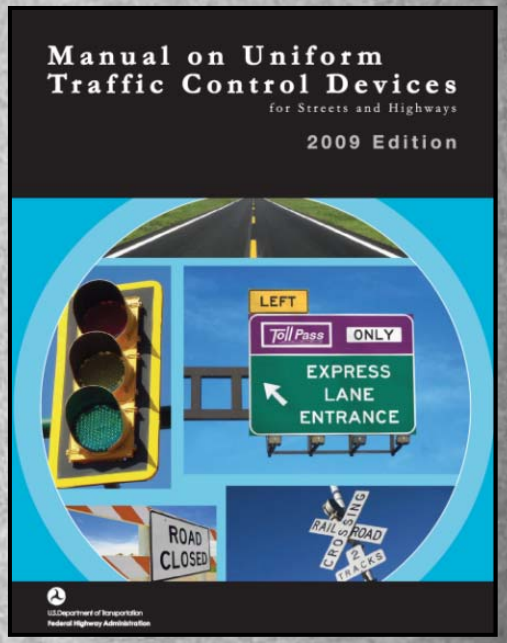
Master Planning

Phone: 870-540-3231

Email: timothy.h.fox.civ@mail.mil

Authority of MUTCD

- Study will commonly reference the MUTCD
- The MUTCD is the national standard for traffic control devices and applies to military installations per military regulations
- It ensures uniformity among traffic control devices:
  - To reduce confusion
  - By applying proven and vetted standards for traffic safety on military installations.
- It applies to all streets, highways, pedestrian facilities, bikeways, or private roads "open to public travel"
- http://mutcd.fhwa.dot.gov/kno_2009.htm
- There is no state MUTCD or state supplement
- DoD Supplement to the MUTCD, SDDCTEA, 2015
  - The DOD Supplement is intended to be a companion document to the national MUTCD



Authority of MUTCD

- Multi-Service Regulation (AR 55-80, OPNAVINST 11210.2, AFMAN 32-1017, MCO 11210.2D and DLAR 4500.19)
  - "Installation commanders will develop and maintain their roadways to nationally accepted standards that provide a safe driving environment for all drivers and passengers."
  - "All installation traffic signals, signs, and pavement markings will be in substantial conformance to FHWA's Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) (http://mutcd.fhwa.dot.gov)."
  - "Variances in the design and application of installation traffic control devices from the standards contained in MUTCD must be approved by (SDDCTEA) and FHWA."

Authority of MUTCD

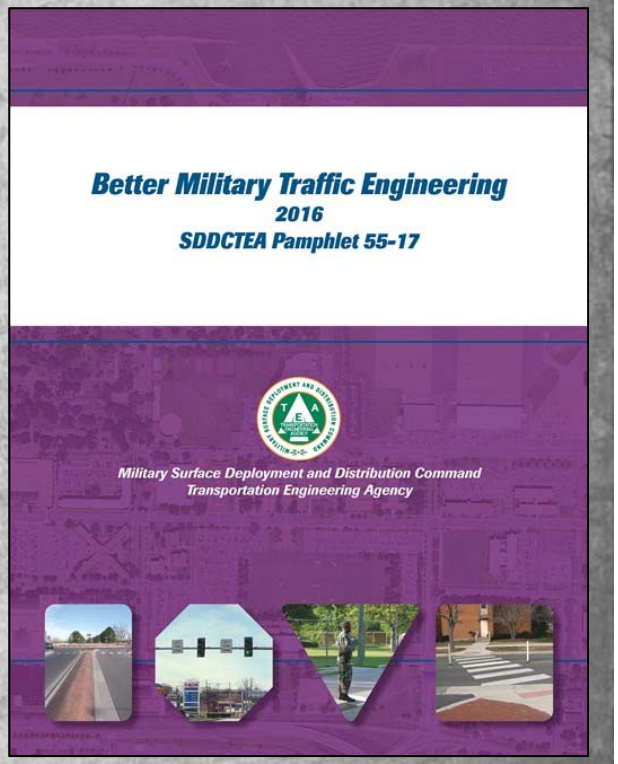
- Code of Federal Regulations: Title 32: National Defense, Subtitle A: Department of Defense, Chapter V: Department of the Army (but applicable to all branches), Part 634: Motor Vehicle Traffic Supervision

  (h) Facility engineer (public works officer at Navy installations). The facility engineer, engineer officer or civil engineer at Air Force installations, in close coordination with the law enforcement officer, will-

  (3) Ensure that traffic signs, signals, and pavement markings conform to the standards in the current Manual on Uniform Traffic Control Devices for Streets and Highways.

Authority of MUTCD

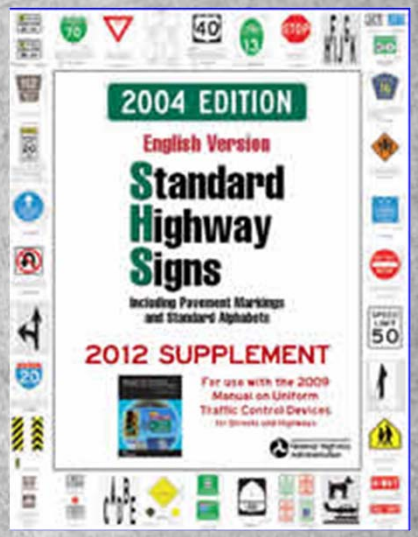
- SDDCTEA Pamphlet 55-17, titled "Better Military Traffic Engineering" and dated 2016.
  - Complies with the MUTCD and includes guidance for military installations
  - Includes the design for about 40 signs that are not included in the MUTCD or the Standard Highway Signs Manual (SHSM). Military installations should use these signs when applicable instead of designing their own
  - When other designs are required, installations should consult SDDCTEA for design assistance



http://www.sddc.army.mil/sites/TEA/Functions/SpecialAssistant/TrafficEngineeringBranch/Pages/default.aspx

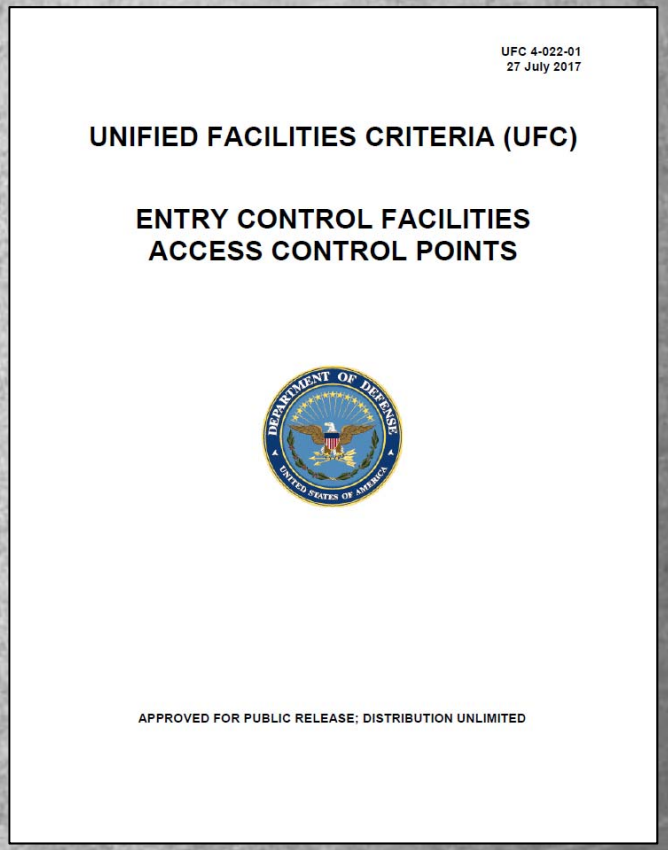
Authority of MUTCD

- Standard Highway Signs Manual (SHSM) 2012 supplement includes design details of new and modified signs that were added in the 2009 Edition of the MUTCD
- The contents of the 2012 supplement will be included into a new edition of the SHSM that will be concurrently released with the next edition of the MUTCD



ACP Reference Documents

- Unified Facilities Criteria (UFC) 4-022-01, Entry Control Facilities/ Access Control Points
  - This UFC presents a unified approach between military service branches regarding the design features necessary to ensure that infrastructure constructed today will have the flexibility to support future technologies, a changing threat environment, and changes in operations
  - "Should" and "must" conditions
  - **Shall conditions must be followed**


UFC 4-022-01
27 July 2017

UNIFIED FACILITIES CRITERIA (UFC)

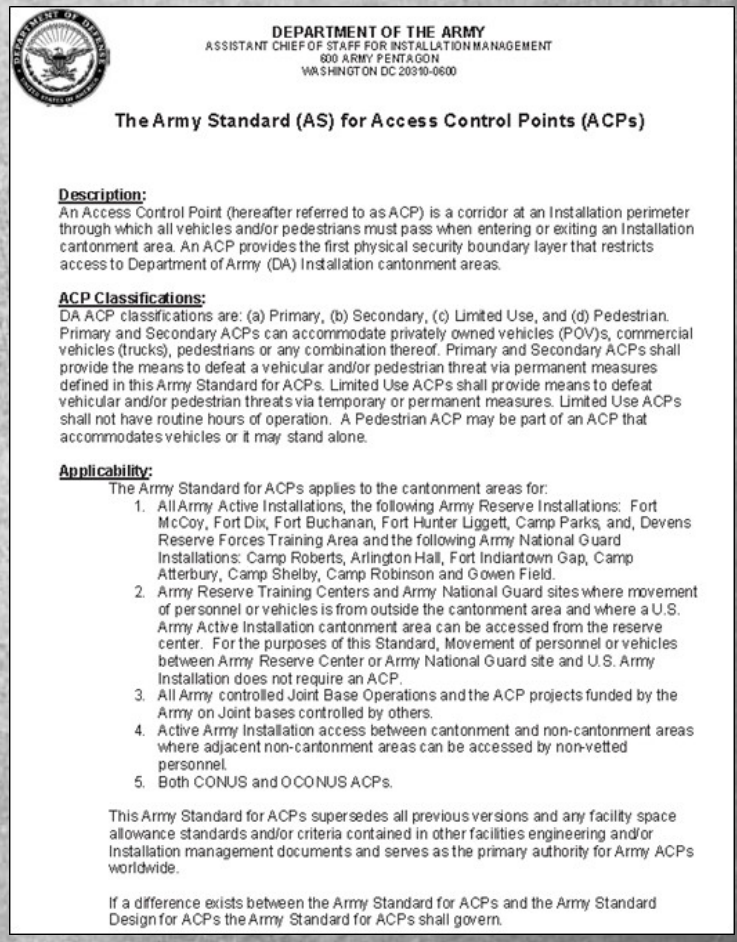
ENTRY CONTROL FACILITIES
ACCESS CONTROL POINTS

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED

Note: Updated version recently released in July 2017

ACP Evaluation

- Army Access Control Points Standard Design/Criteria
  - Includes standard drawings and supporting appendices
  - Links security needs and engineering requirements
  - Provides detailed guidance on AVB placement as well as traffic and safety requirements
  - Partially updated in 2012 and 2013



DEPARTMENT OF THE ARMY
ASSISTANT CHIEF OF STAFF FOR INSTALLATION MANAGEMENT
600 ARMY PENTAGON
WASHINGTON DC 20310-0600

The Army Standard (AS) for Access Control Points (ACPs)

Description:
An Access Control Point (hereafter referred to as ACP) is a corridor at an Installation perimeter through which all vehicles and/or pedestrians must pass when entering or exiting an Installation cantonment area. An ACP provides the first physical security boundary layer that restricts access to Department of Army (DA) Installation cantonment areas.

ACP Classifications:
DA ACP classifications are: (a) Primary, (b) Secondary, (c) Limited Use, and (d) Pedestrian. Primary and Secondary ACPs can accommodate privately owned vehicles (POV)s, commercial vehicles (trucks), pedestrians or any combination thereof. Primary and Secondary ACPs shall provide the means to defeat a vehicular and/or pedestrian threat via permanent measures defined in this Army Standard for ACPs. Limited Use ACPs shall provide means to defeat vehicular and/or pedestrian threats via temporary or permanent measures. Limited Use ACPs shall not have routine hours of operation. A Pedestrian ACP may be part of an ACP that accommodates vehicles or it may stand alone.

Applicability:
The Army Standard for ACPs applies to the cantonment areas for:

1. All Army Active Installations, the following Army Reserve Installations: Fort McCoy, Fort Dix, Fort Buchanan, Fort Hunter Liggett, Camp Parks, and, Devens Reserve Forces Training Area and the following Army National Guard Installations: Camp Roberts, Arlington Hall, Fort Indiantown Gap, Camp Atterbury, Camp Shelby, Camp Robinson and Gowen Field.
2. Army Reserve Training Centers and Army National Guard sites where movement of personnel or vehicles is from outside the cantonment area and where a U.S. Army Active Installation cantonment area can be accessed from the reserve center. For the purposes of this Standard, Movement of personnel or vehicles between Army Reserve Center or Army National Guard site and U.S. Army Installation does not require an ACP.
3. All Army controlled Joint Base Operations and the ACP projects funded by the Army on Joint bases controlled by others.
4. Active Army Installation access between cantonment and non-cantonment areas where adjacent non-cantonment areas can be accessed by non-vetted personnel.
5. Both CONUS and OCONUS ACPs.

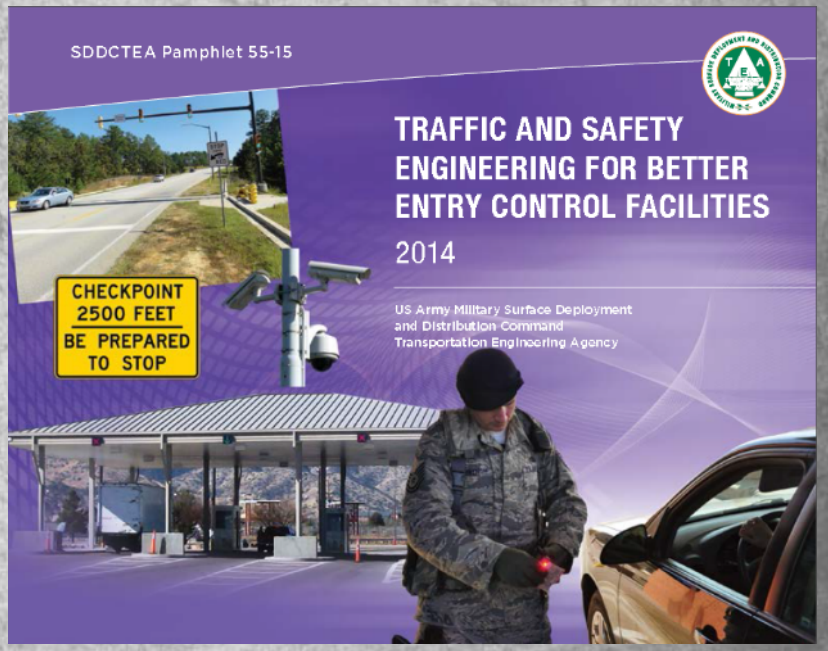
This Army Standard for ACPs supersedes all previous versions and any facility space allowance standards and/or criteria contained in other facilities engineering and/or Installation management documents and serves as the primary authority for Army ACPs worldwide.

If a difference exists between the Army Standard for ACPs and the Army Standard Design for ACPs the Army Standard for ACPs shall govern.

ACP Reference Documents

- SDDCTEA Pamphlet 55-15, Traffic and Safety Engineering for Better Entry Control Facilities (the SDDCTEA Gates Manual)
  - Supplements other existing criteria and guidance
  - Bridges the gap between ACP standards and national engineering standards
- In most cases, serves as a standard through referencing:
  - Referenced in UFC 4-022-01
  - Referenced in Army Standard Design Criteria
  - Per joint regulation OPNAVINST 11210.2
- Pamphlet 55-15 and other publications/bulletins can be found on SDDCTEA's website at:

http://www.sddc.army.mil/sites/TEA/Functions/SpecialAssistant/TrafficEngineeringBranch/Pages/default.aspx



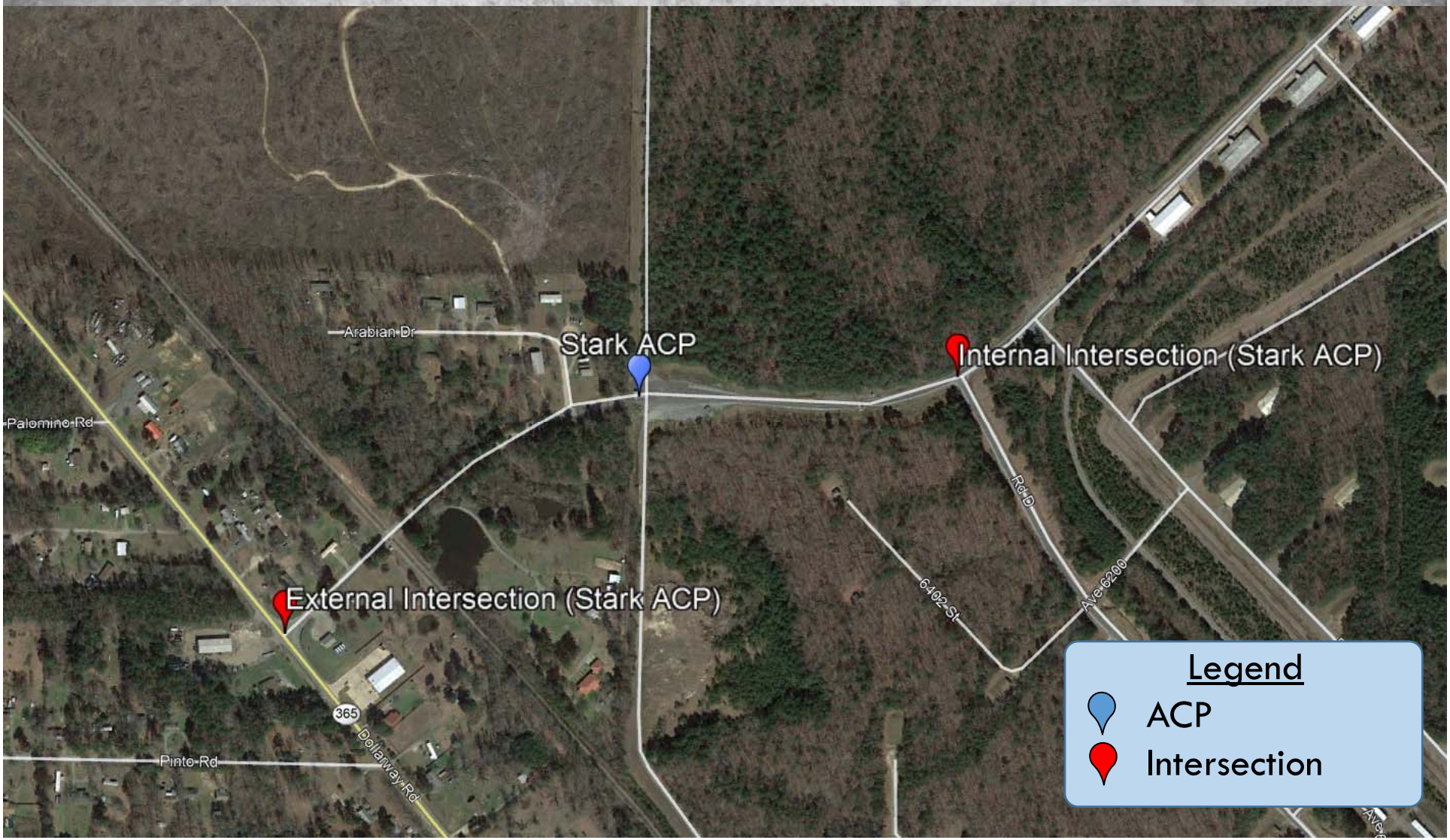
Study Goals

- Conduct a traffic engineering and safety analysis of three (3) Access Control Points (ACP) and six (6) adjacent intersections.
- Specific tasks include:
  - Traffic Data Collection (24-hour and Turning Movement Counts)
  - Road Safety Assessment at Study Intersections and ACP
  - Existing Conditions Analysis at study ACP
  - Interview ID check personnel
  - Future Traffic Volume Projections
  - Future Conditions Analysis
  - Calculate Future Processing Lane Needs
  - Improvement Options and Cost Estimates

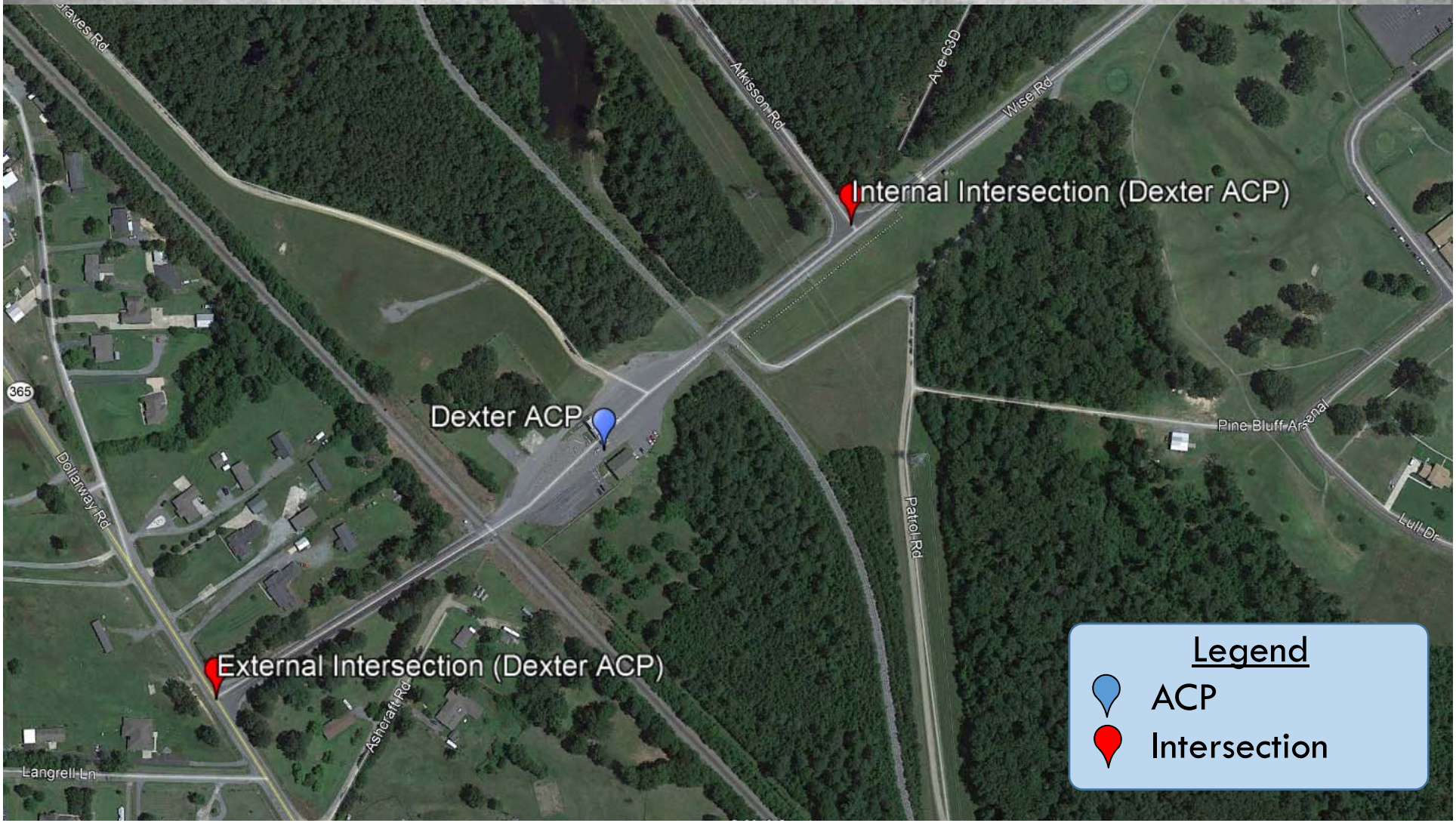
Study Activities: Traffic Data Collection

- Observe peak period gate operations and record queuing in 15-minute intervals to calculate existing demand
- Conduct AM, Midday, and PM peak intersection turning movement counts (TMCs) at six total intersections
- Data will be collected for each intersection on either Tuesday, Wednesday, or Thursday
- Refer to slides 16-18 for the TMC and ACP locations

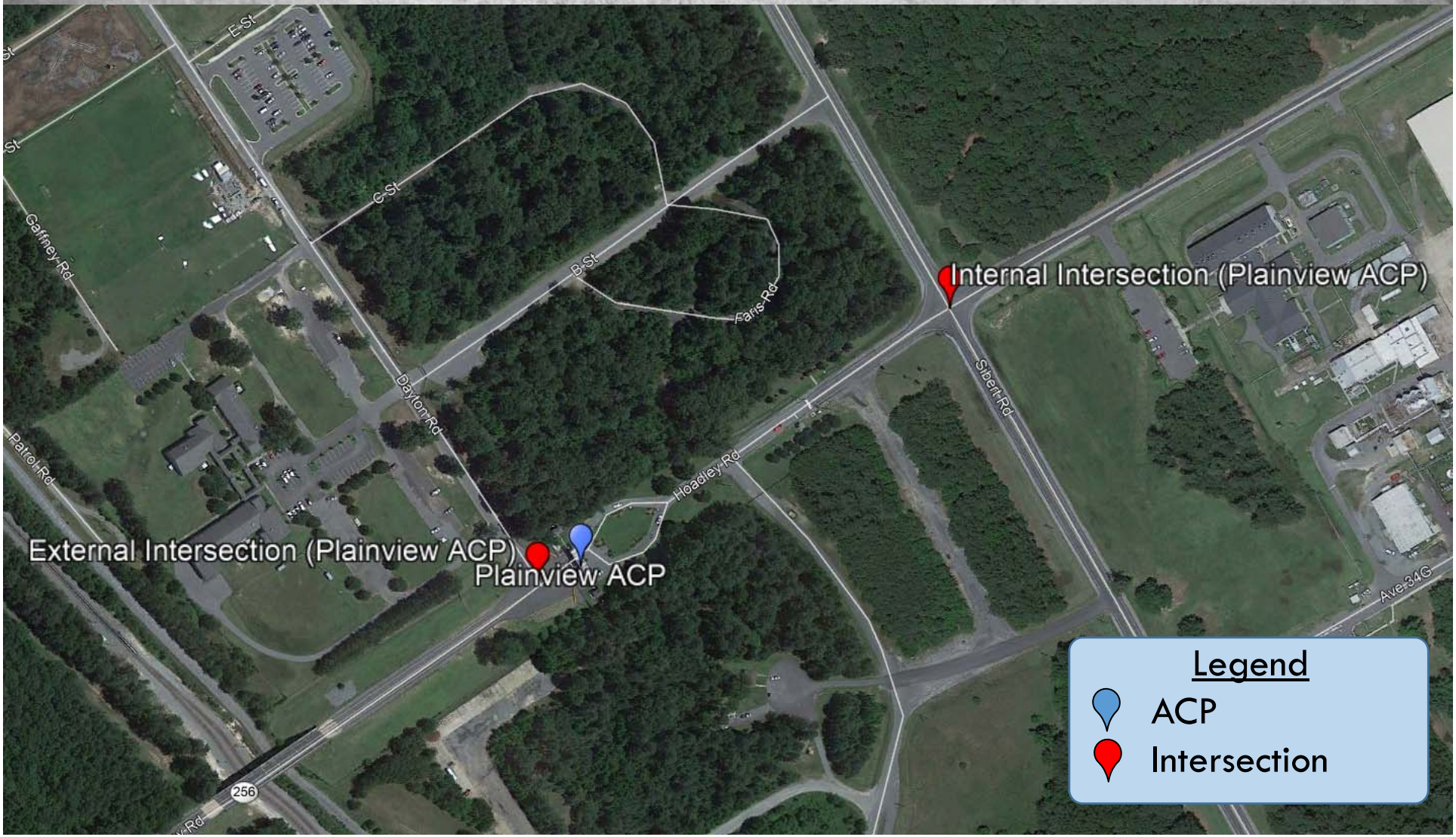
Study Activities – Data Collection Locations



Study Activities – Data Collection Locations



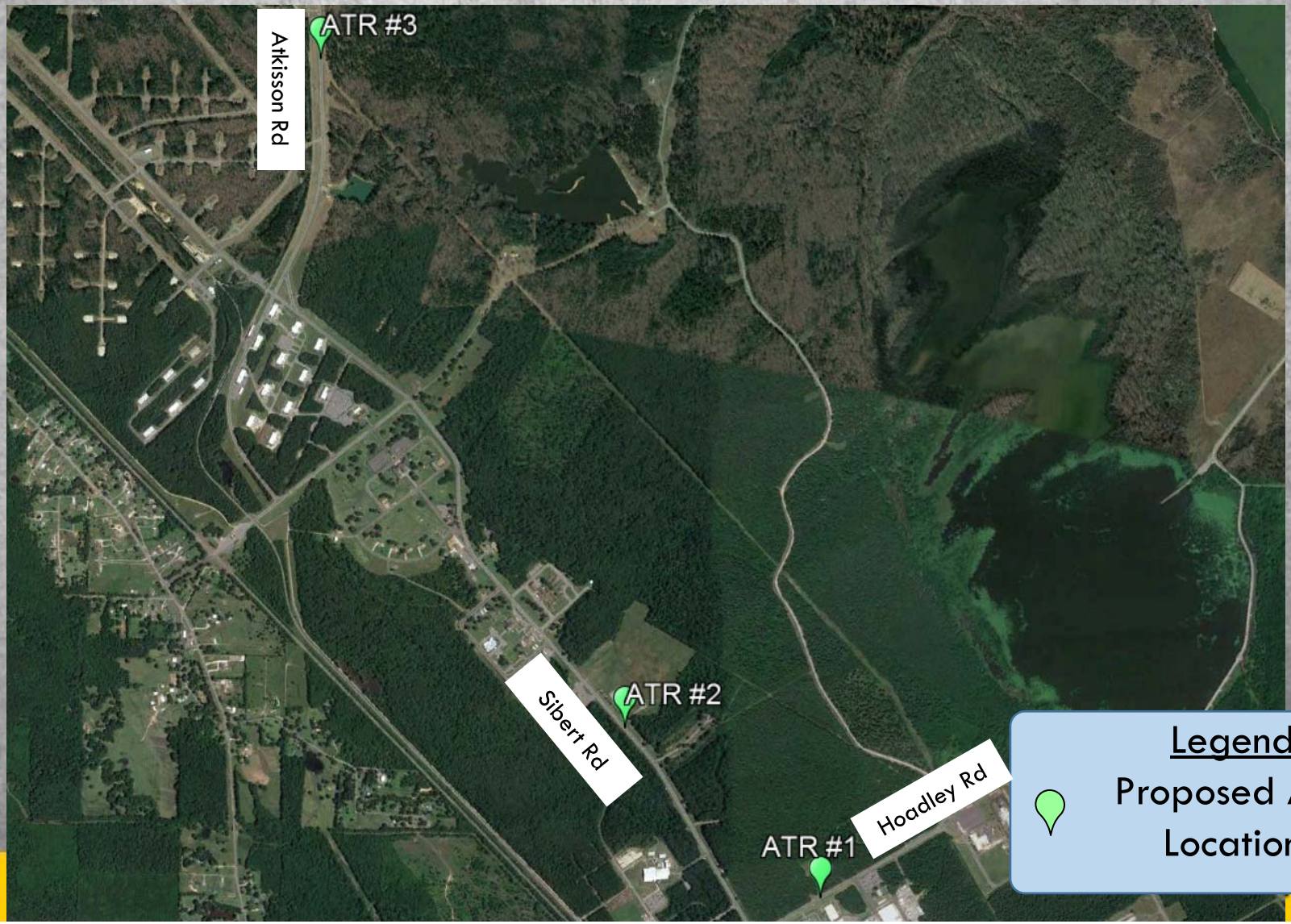
Study Activities – Data Collection Locations



Study Activities: Traffic Data Collection

- 24-hour automatic traffic recorder (ATR) counts at three (3) locations
- Counters will collect 24 hours of data
  - A speed summary will be included in the report (roadway locations only)
  - Refer to slide 21 for the ATR roadway locations

Study Activities – Data Collection Locations



Study Activities: Traffic Data Collection

- Examples of count equipment to be used

In lane “card” counter

Roadside radar counter

Study Activities: Road Safety Assessment

Conduct a Roadside Safety Assessment and provide remedial recommendations for ACPs and studied intersections. The following items will be addressed:

- Traffic control
- Lane configuration
- Signing
- Striping
- Design vehicle accommodation
- Operational concerns
- Intersection Sight Distance
- Roadside hazards
- Improper traffic control devices
- Bicycle and pedestrian access
- Analysis of most recent 5 years of crash data (if available)

Study Activities

- Identify and document planned growth
- Document peak hour periods and existing demand volumes at ACP and adjacent study intersections
- Calculate future traffic demand
- Calculate the future number of ACP processing lanes
- Analyze existing and future intersection capacity and traffic flow

Study Activities

- Inspect and evaluate the study ACPs for roadway signing and striping, compliance with UFC and Army ACP Standard Design/Criteria, and roadside safety
- The assessment approach will assist with the following:
  - Verify compliance with standards and guidelines
  - Identify short-term and low-cost enhancements
  - Identify long-term enhancements to support future growth **(only the intersections as necessary)**
  - Assess lane requirements

Status of Study Data Requests

Request	Received? (Yes/No)
Aerial Imagery	
Crash Data	
Copies of Previous Studies	
Master Planning / Growth Projections	
Population / Deployment Information	

Next Steps

Activity	Anticipated Date
In-Brief and Data Collection	26 February 2018 to 2 March 2018
Draft Report Submittal to and Review by SDDCTEA	April 2018
Installation Out-Brief/Draft Report Submittal to Installation	Mid May 2018 (15-day review period)
Draft Final Report Submittal to Installation and SDDCTEA	Mid June 2018 (15-day review period)
Final Report	July 2018

SDDC

MILITARY SURFACE DEPLOYMENT & DISTRIBUTION COMMAND

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10 BRIGADES GEOGRAPHICALLY LOCATED TO SUPPORT COMBATANT COMMANDERS

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Gannett Fleming

Pine Bluff Arsenal
Entry Control Facility Study
Outbrief Meeting Minutes

By:	Mark Metil, Gannett Fleming Inc.
Date of Meeting:	24 May 2018 / 0830 hrs
Project:	Pine Bluff Arsenal Entry Control Facility Study
Project Location:	Pine Bluff, Arkansas
Subject:	Outbrief Meeting

The following were in attendance:

Name	Organization	Phone	Email
Mark Metil	Gannett Fleming	717-564-0128	mmetil@gfnet.com
Mike McCormack	PBA-D PW	870-540-3301	michael.j.mccormack12.civ@mail.mil
Stephen Redman	PBA-D PW	870-540-2834	stephen.d.redman2.civ@mail.mil
Tim Fox	PBA-D PW	870-540-3132	timothy.h.fox.civ@mail.mil
Shane A. Hubanks	PM-JLE&S	870-540-3218	shane.a.hubanks.civ@mail.mil
James Goddard	DPW-BOFD	870-540-3323	james.e.goddard.civ@mail.mil
Paul Jarrell	FES Fire	870-540-3511	paul.a.jarrell2.civ@mail.mil

The purpose of the meeting was to discuss the preliminary findings of the traffic analysis. Mark Metil briefed from a prepared presentation. In addition, the following items were discussed:

- The installation prefers the use of the STOP sign at the ID check area. GF will provide the detail for the recent STOP sign assembly developed by SSCOE.
- The installation would like the detail for the AVB markings.

Please Note:
The above meeting synopsis represents the major discussion points and agreements. Should anyone have any additions, modifications, or corrections, please submit them in writing to Mark Metil at mmetil@gfnet.com within five working days of the date of issuance of these meeting minutes. Should no additions be received within ten working days, these minutes will stand as the official minutes and will be duly incorporated into the project files.

UNCLASSIFIED

SDDC

MILITARY SURFACE DEPLOYMENT & DISTRIBUTION COMMAND

SURFACE WARRIORS

SDDC MOVES AND SUSTAINS FORCES AND MATERIEL ACROSS THE NATION AND AROUND THE GLOBE.

TRAFFIC ENGINEERING AND SAFETY STUDIES FOR AN ENTRY CONTROL FACILITY STUDY

Pine Bluff Arsenal, Arkansas

Mark Metil, P.E., PTOE
Gannett Fleming, Inc.

24 May 2018

WE ARE THE U.S. ARMY SERVICE COMPONENT COMMAND OF THE U.S. TRANSPORTATION COMMAND
AND A MAJOR SUBORDINATE COMMAND OF THE U.S. ARMY MATERIEL COMMAND

TRUSTED PROFESSIONALS…DELIVERING READINESS AND LETHALITY!

UNCLASSIFIED

AGENDA

- Introduction
- Reference Documents
- Background
- Data Collection
- Traffic Analysis
- Short-term Improvements
- ECF Recommendations
- Next Steps

INTRODUCTION: SDDCTEA

Organization and Mission:	U.S. Army Military Surface Deployment and Distribution Command Transportation Engineering Agency (SDDCTEA) Traffic Engineering Branch *Our mission is to improve highway safety and reduce traffic congestion on DoD installation roads and on routes providing access to installations.*
Address:	1 Soldier Way, Scott AFB, IL 62225-5006
Points of Contact:	Mike Carda, P.E., PTOE: 618-220-5450 email: mickeal.d.carda.civ@mail.mil Jason Cowin, P.E., Branch Chief: 618-220-5218 email: jason.w.cowin.civ@mail.mil Organizational email: army.sddc.safb.traffic@mail.mil
Fax:	Commercial: 618-220-5125
Webpage:	http://www.sddc.army.mil/sites/tea Sign up for mailing list on: http://www.sddc.army.mil/sites/TEA/Functions/SpecialAssistant/TrafficEngineeringBranch/Pages/default.aspx

INTRODUCTION: SDDCTEA SERVICES & PRODUCTS

- Traffic engineering studies:
  - In-house and contracted
  - Have 30 – 40 studies ongoing at any one time for all branches of the military
- Produce and distribute multiple pamphlets
- Produce and distribute 4-5 bulletins per year for 2,000+ contacts
- Host 3-4 traffic engineering workshops annually, regarding traffic engineering and safety along roadways, at intersections, and at Entry Control Facilities (ECFs)
- Develop software for "right-sizing" gates and to assist with other traffic engineering calculations
- SDDCTEA publications/bulletins can be found on their website - http://www.sddc.army.mil/sites/TEA/Functions/SpecialAssistant/TrafficEngineeringBranch/Pages/default.aspx
- Created DoD Supplement to the MUTCD - http://www.sddc.army.mil/sites/TEA/Functions/SpecialAssistant/TrafficEngineeringBranch/Documents/MUTCD_DOD_Supplement_Revision_20150601.pdf

INTRODUCTION: GANNETT FLEMING

- International multi-disciplinary engineering firm established in 1915
  - Headquarters in Camp Hill, PA
  - 50+ offices
  - Have provided A/E support to SDDCTEA since 1999 including over 50 comprehensive studies, over 400 ECF assessments, nearly 40 sign management systems, and numerous traffic engineering and safety studies
- Assisted in the development of the following materials:
  - SDDCTEA Pamphlet 55-8, Traffic Engineering Studies Reference
  - SDDCTEA Pamphlet 55-15, Traffic and Safety Engineering for Better Entry Control Facilities
  - SDDCTEA Pamphlet 55-17, Better Military Traffic Engineering
  - Department of the Army, The Army Standard (AS) for Access Control Points (ACPs)

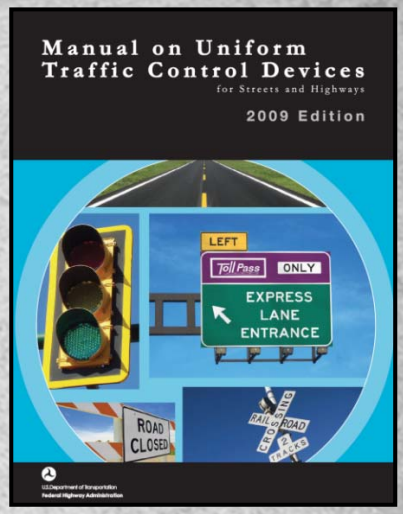
Gannett Fleming

Gannett Fleming
207 Senate Avenue
Camp Hill, PA 17011
(717) 763-7211

Study Team Lead:
Mark Metil, P.E., PTOE
Email: mmetil@gfnet.com
Office: 717-763-7212 2321
Cell: 717-645-0128

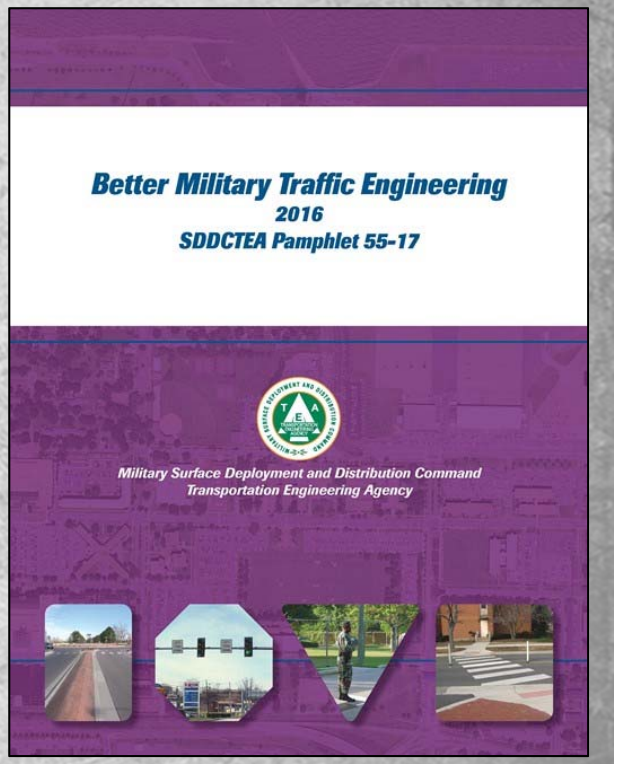
REFERENCE DOCUMENTS

- Study will commonly reference the MUTCD
- The MUTCD is the national standard for traffic control devices and applies to military installations per military regulations
- It ensures uniformity among traffic control devices:
  - To reduce confusion
  - By applying proven and vetted standards for traffic safety on military installations.
- It applies to all streets, highways, pedestrian facilities, bikeways, or private roads "open to public travel"
- http://mutcd.fhwa.dot.gov/kno_2009.htm
- DoD Supplement to the MUTCD, SDDCTEA, 2015
  - The DOD Supplement is intended to be a companion document to the national MUTCD



REFERENCE DOCUMENTS

- SDDCTEA Pamphlet 55-17, titled "Better Military Traffic Engineering" and dated 2016.
  - Complies with the MUTCD and includes guidance for military installations.
  - Includes the design for about 40 signs that are not included in the MUTCD or the Standard Highway Signs Manual (SHSM). Military installations should use these signs when applicable instead of designing their own.
  - When other designs are required, installations should consult SDDCTEA for design assistance.

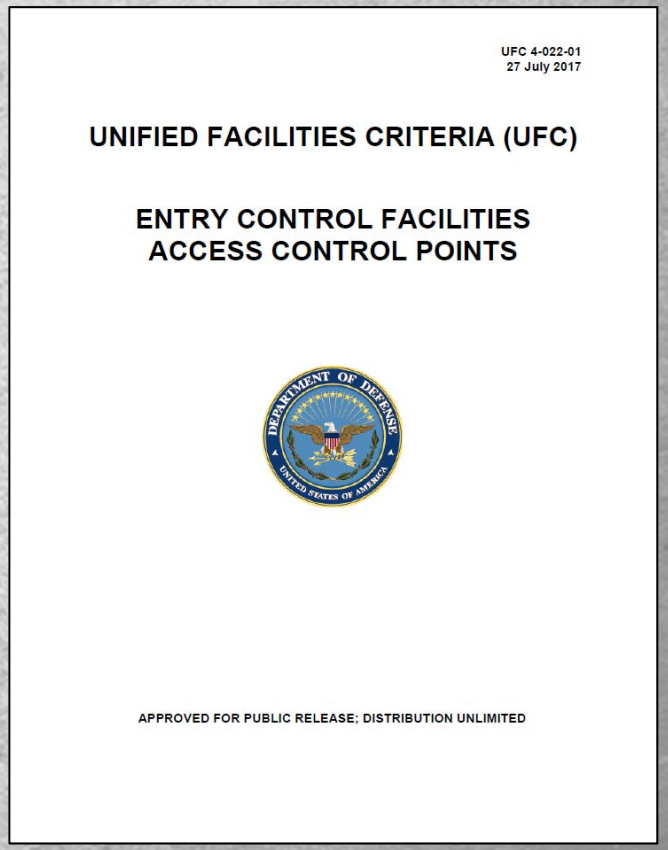


http://www.sddc.army.mil/sites/TEA/Functions/SpecialAssistant/TrafficEngineeringBranch/Pages/default.aspx

REFERENCE DOCUMENTS

- Unified Facilities Criteria (UFC) 4-022-01, Entry Control Facilities/ Access Control Points
  - This UFC presents a unified approach between military service branches regarding the design features necessary to ensure that infrastructure constructed today will have the flexibility to support future technologies, a changing threat environment, and changes in operations
  - "Recommendations" versus "Must" conditions
  - **"Must" conditions must be followed**

Note: Updated version released in July 2017


UFC 4-022-01
27 July 2017

UNIFIED FACILITIES CRITERIA (UFC)

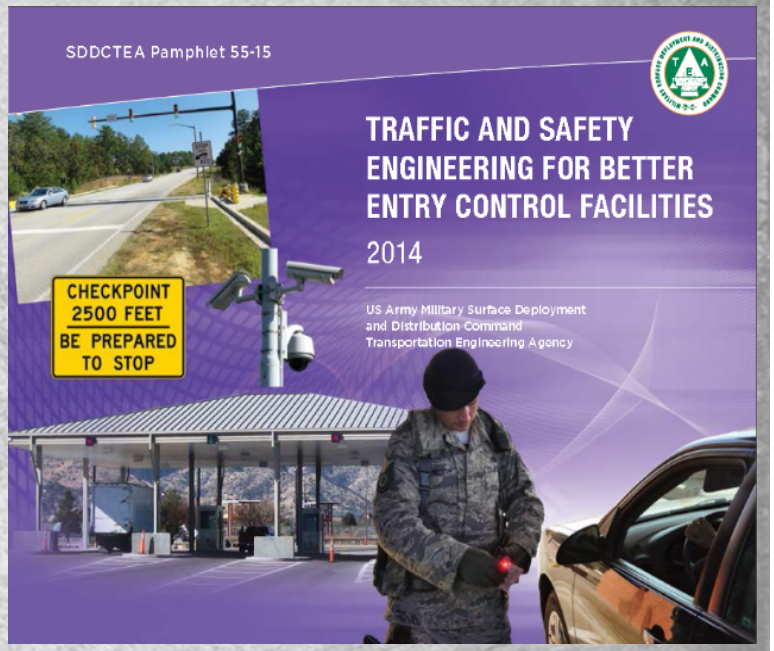
ENTRY CONTROL FACILITIES
ACCESS CONTROL POINTS

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED

REFERENCE DOCUMENTS

- SDDCTEA Pamphlet 55-15, Traffic and Safety Engineering for Better Entry Control Facilities (the SDDCTEA Gates Manual)
  - Supplements other existing criteria and guidance
  - Bridges the gap between ECF standards and national engineering standards
- In most cases, serves as a standard through referencing:
  - Referenced in UFC 4-022-01
  - Referenced in Army Standard Design Criteria
  - Per joint regulation OPNAVINST 11210.2 and AFMAN 32-1017
- Pamphlet 55-15 and other publications/bulletins can be found on SDDCTEA's website at:

http://www.sddc.army.mil/sites/TEA/Functions/SpecialAssistant/TrafficEngineeringBranch/Pages/default.aspx



BACKGROUND

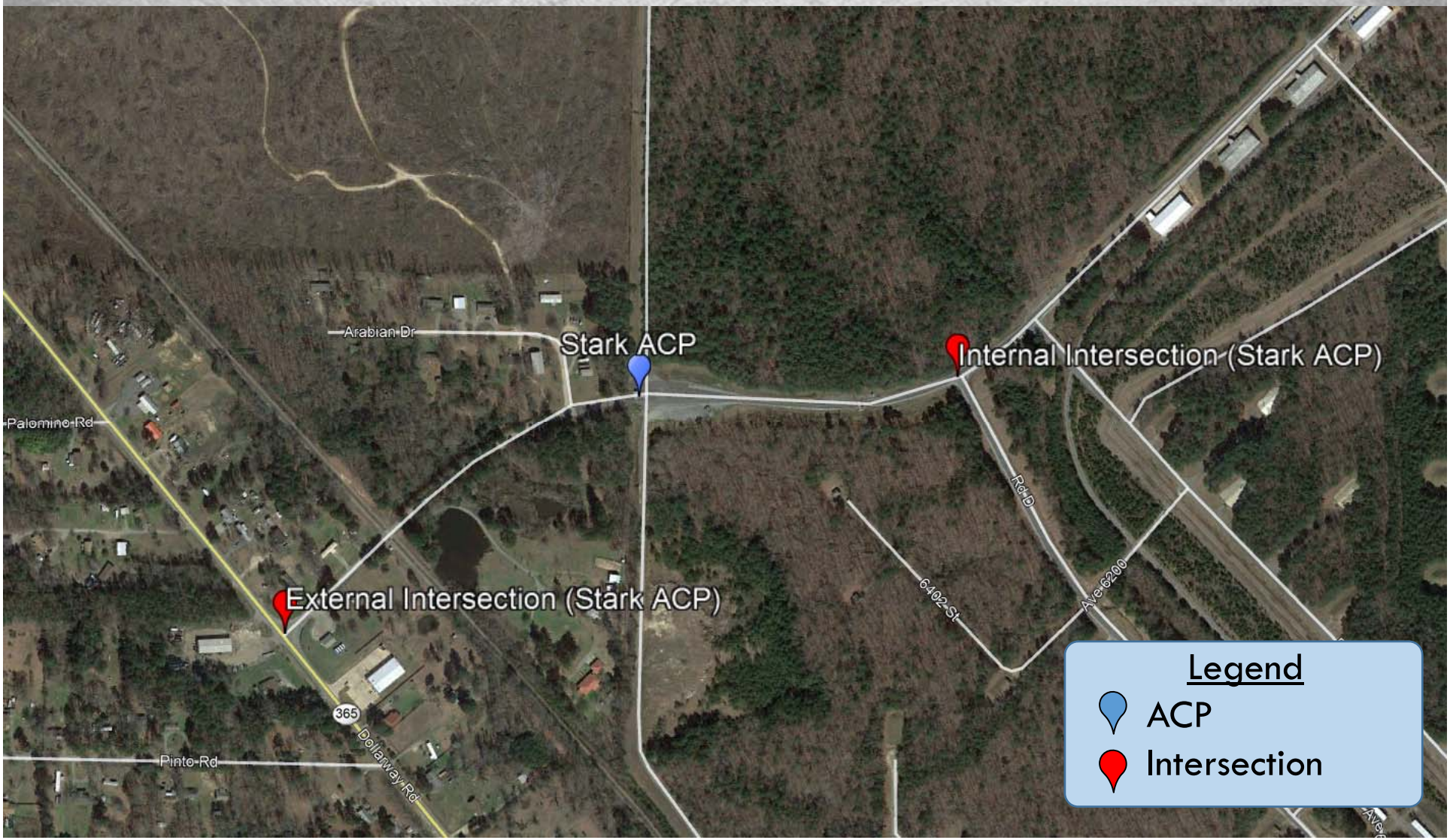
- Inbrief meeting held on 26 February 2018
- Data collection activities performed 27 February-1 March 2018
- This outbrief summarizes the procedures, analyses, and preliminary improvement options to be presented in the draft report

BACKGROUND

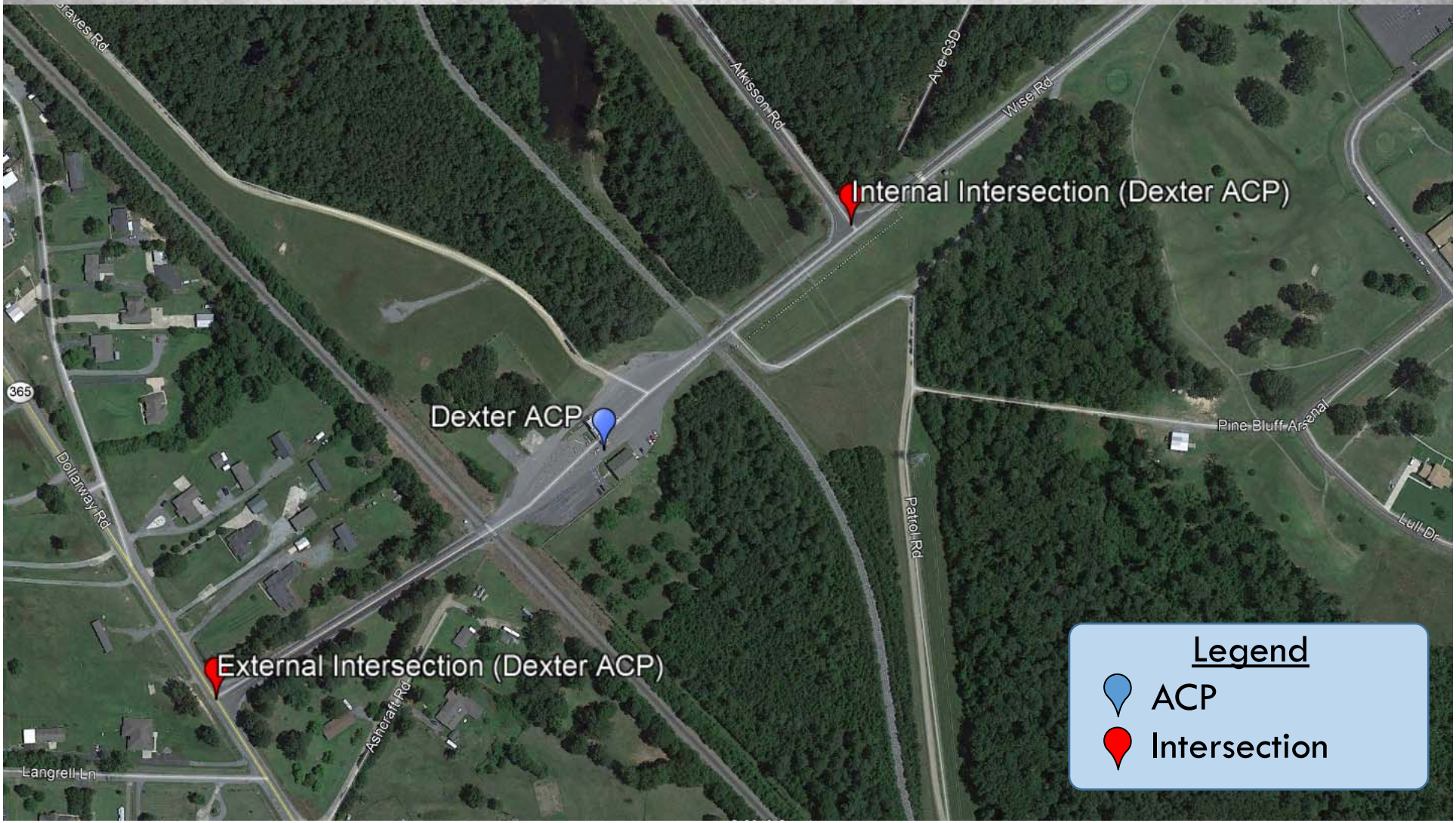
- Conduct a traffic engineering and safety analysis of the Entry Control Facilities (ECFs) at Pine Bluff Arsenal and its adjacent intersections:

- Specific tasks include:
  - Traffic Data Collection (24-hour and Turning Movement Counts)
  - Road Safety Assessment
  - ECF Compliance Assessment
  - Existing Conditions Analysis
  - Future Traffic Volume Projections
  - Future Conditions Analysis
  - Calculate Future Processing Lane Needs
  - Improvement Options and Cost Estimates

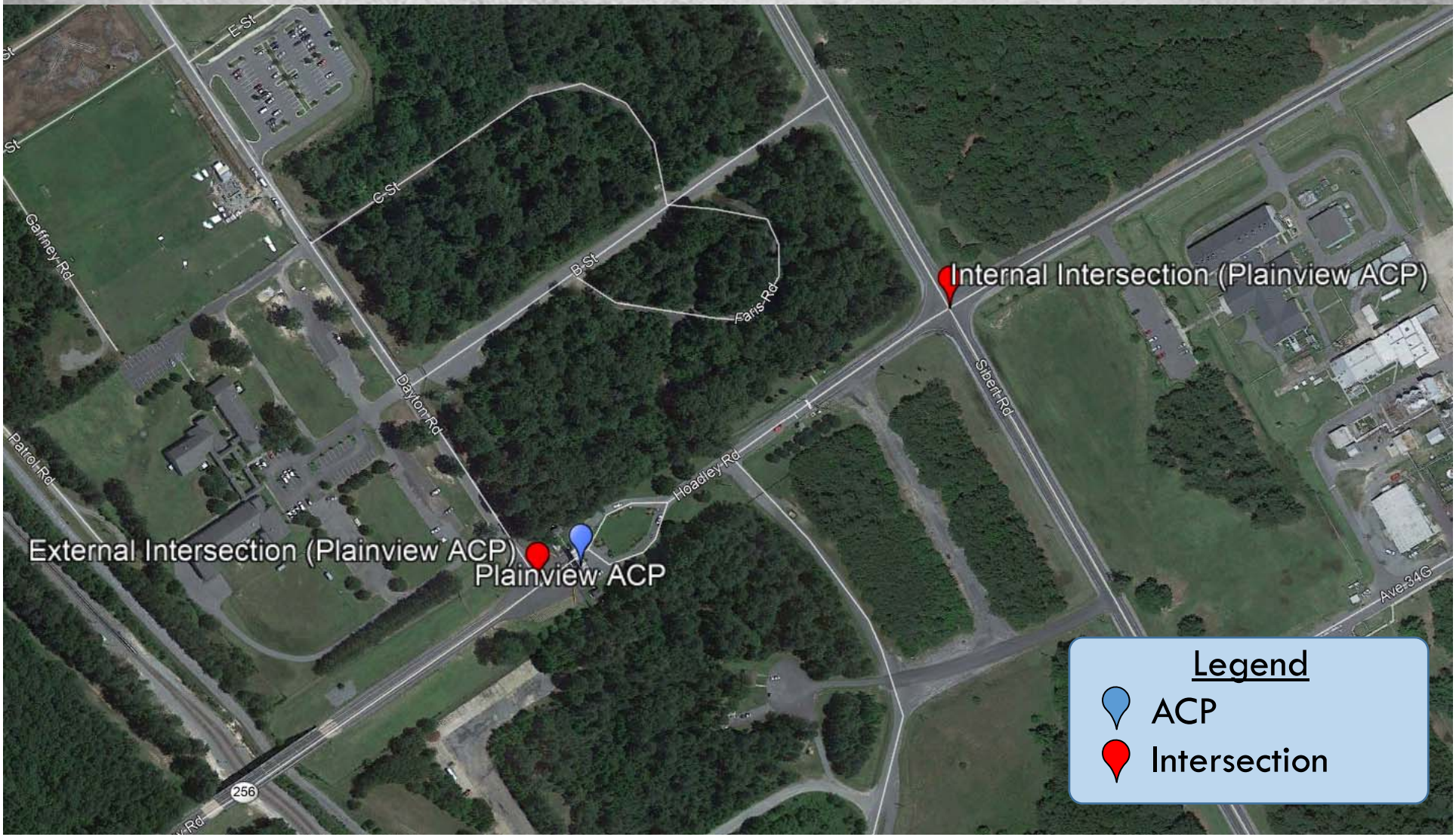
DATA COLLECTION - LOCATIONS



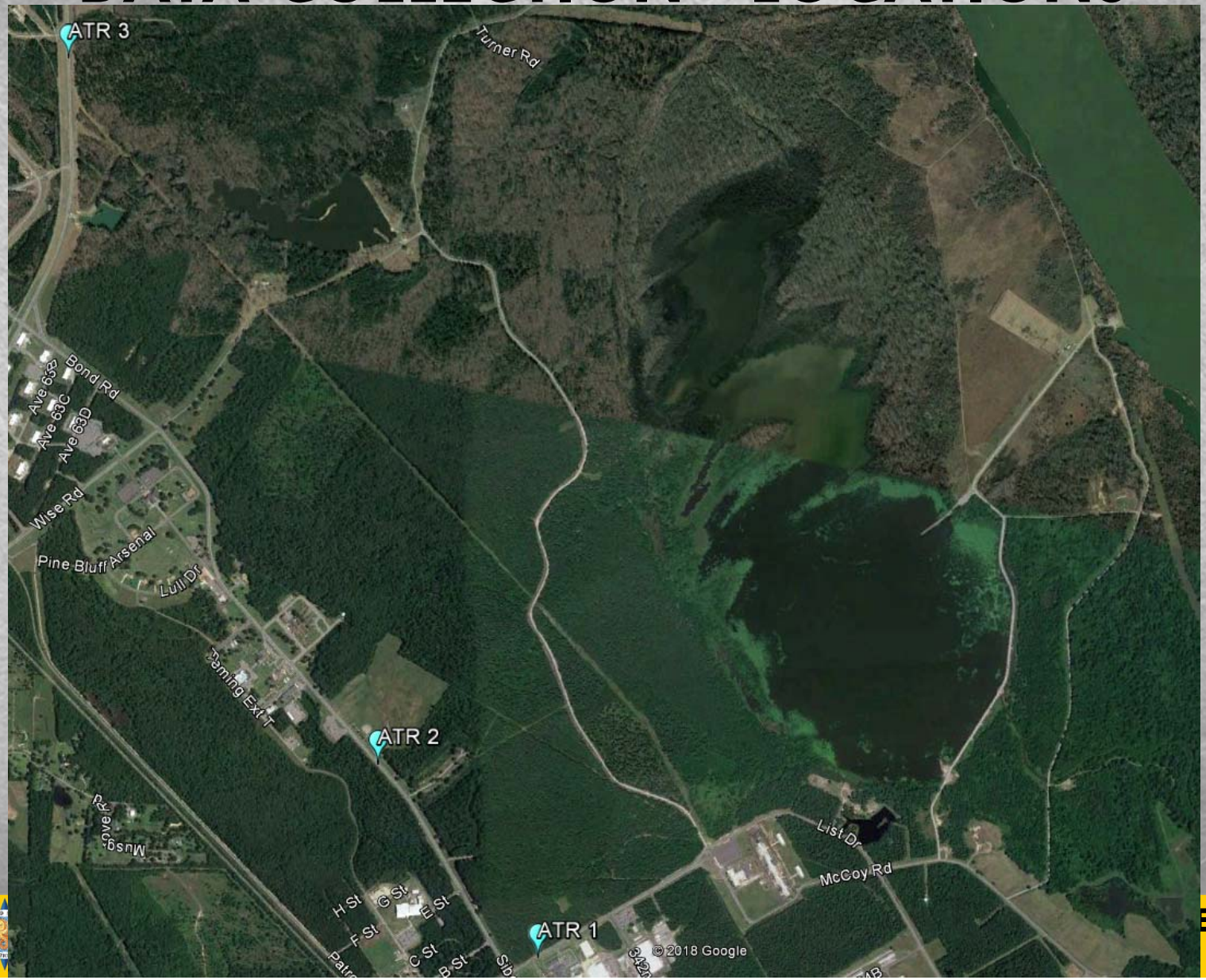
DATA COLLECTION - LOCATIONS



DATA COLLECTION - LOCATIONS



DATA COLLECTION - LOCATIONS



DATA COLLECTION - VOLUMES

24-hour Volumes

ACP	2-27-18	2-28-18
Plainview Gate Inbound	668	609
Plainview Gate Outbound	688	653
Dexter Gate Inbound	381	365
Dexter Gate Outbound	393	366
Stark Gate Inbound	332	345
Stark Gate Outbound	342	348

ACP Interval Volume and Queueing (Plainview Gate)

Interval	Departure Volume (Processed Vehicle Count)	Queue (Vehicles)	Delta Q ($Q15_{final}$-$Q15_{initial}$)	Arrival Volume (Departure Volume + Delta Q)
0530-0545	19	0	0	19
0545-0600	36	0	0	36
0600-0615	50	1	1	51
0615-0630	64	0	-1	63
0630-0645	34	0	0	34
0645-0700	21	0	0	21
0700-0715	33	0	0	33
0715-0730	12	0	0	12
0730-0745	20	0	0	20

DATA COLLECTION - VOLUMES

ACP Interval Volume and Queueing (Dexter Gate)

Interval	Departure Volume (Processed Vehicle Count)	Queue (Vehicles)	Delta Q ($Q15_{final}$-$Q15_{initial}$)	Arrival Volume (Departure Volume + Delta Q)
0515-0530	8	0	0	8
0530-0545	7	0	0	7
0545-0600	17	3	3	20
0600-0615	33	3	0	33
0615-0630	53	0	-3	50
0630-0645	19	0	0	19
0645-0700	11	0	0	11
0700-0715	11	0	0	11

ACP Interval Volume and Queueing (Stark Gate)

Interval	Departure Volume (Processed Vehicle Count)	Queue (Vehicles)	Delta Q ($Q15_{final}$-$Q15_{initial}$)	Arrival Volume (Departure Volume + Delta Q)
0615-0630	32	0	0	32
0630-0645	41	0	0	41
0645-0700	36	0	0	36
0700-0715	14	0	0	14
0715-0730	29	0	0	29
0730-0745	25	0	0	25
0745-0800	46	0	0	46
0800-0815	14	0	0	14

DATA COLLECTION - VOLUMES

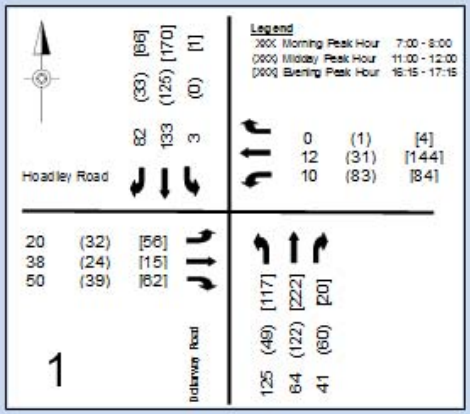
Existing Demand Calculation

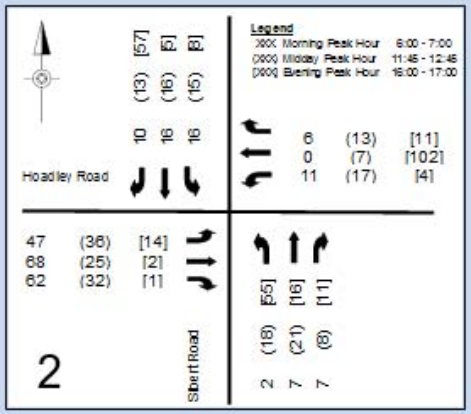
ACP	Peak 15-Minute Inbound Arrival Volume	15-Minute Intervals/ Hour	Existing Demand Volume
Plainview Gate	63	4	252
Dexter Gate	50	4	200
Stark Gate	46	4	184

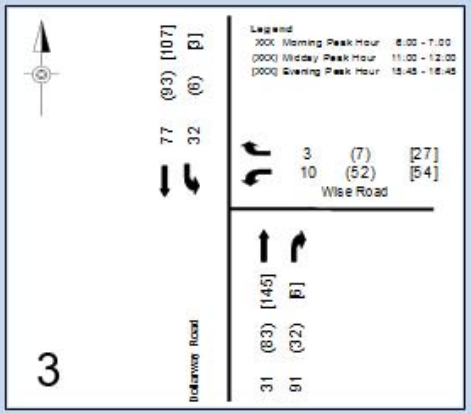
Roadway Volumes

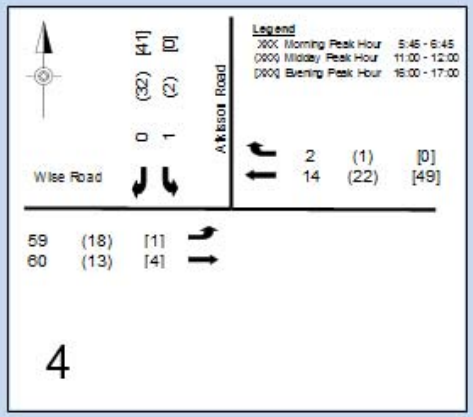
Location	Direction	Time Period	Volume for 2-27	Volume for 2-28
#1 – Hoadley	EB	AM	104	103
		MID	45	52
		PM	31	21
		24-hr	462	436
	WB	AM	35	34
		MID	53	46
		PM	119	121
		24-hr	445	422
#2 - Sibert	NB	AM	71	60
		MID	69	52
		PM	39	35
		24-hr	512	474
	SB	AM	47	46
		MID	50	56
		PM	72	77
		24-hr	587	520
#3 – Atkisson	NB	AM	72	65
		MID	50	49
		PM	21	19
		24-hr	380	339
	SB	AM	31	30
		MID	46	49
		PM	77	61
		24-hr	381	338

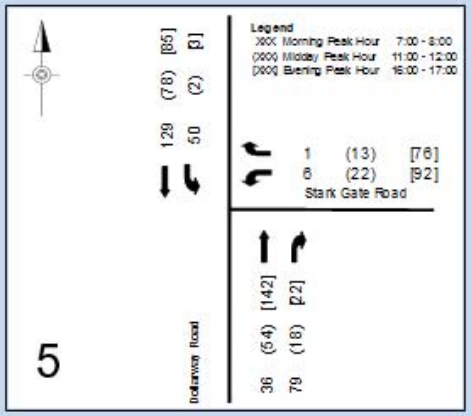
DATA COLLECTION – TMC VOLUMES

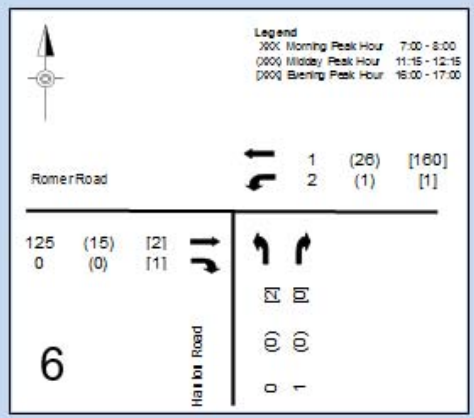












TRAFFIC ANALYSIS - GROWTH

- Jefferson County's population has been decreasing over the past five years and this trend is expected to continue
- Assuming this trend will continue, no growth factor was applied to the public traffic volumes
- The installation does not expect a growth in personnel in a ten-year period; thus, no growth factor was applied

TRAFFIC ANALYSIS - INTERSECTIONS

- Overall intersection level of service (LOS) was utilized to determine future improvement needs

Intersection	Existing LOS		
	AM	MID	PM
Hoadley Road and Dollarway Road	A	A	B
Hoadley Road and Sibert Road	A	A	A
Wise Road and Dollarway Road	A	A	A
Wise Road and Atkisson Road	A	A	A
Stark Gate Road and Dollarway Road	A	A	A
Romer Road and Hanlon Road	A	A	A

SHORT-TERM IMPROVEMENTS

Common Deficiencies

Photo	Deficiency/Corrective Action
	Deficiencies: All sign posts on the installation are fixed posts which are a roadside hazard. Although some of the posts are seemingly protected from errant vehicles behind a curb, curbs are generally recognized as having no significant containment or redirection capability. **Corrective Actions:** Replace all fixed posts with posts that utilize a breakaway design. Several breakaway designs are discussed in section 3.2.2.1 of this report.

Photo	Deficiency/Corrective Action
	Deficiencies: Type I sheeting is prevalent throughout the installation. All regulatory, warning, and guide signs with a green background should utilize Type III or higher sheeting. This sheeting provides levels of retroreflectivity to ensure the signs can be seen during nighttime or low-light conditions. Refer to Section 2A.08 of the MUTCD for standards and guidance relating to maintaining minimum retroreflectivity. The Federal Highway Administration (FHWA) also provides a retroreflective sheeting guide to help identify sheeting types: https://safety.fhwa.dot.gov/roadway_dept/night_visib/sign_visib/sheetguide/ In addition, many of the STOP signs are 24”x24” in size. The minimum size for a STOP sign is 30”x30”. The minimum size for a speed limit sign should be 24”x30”. **Corrective Actions:** Replace all signs that utilize Type I sheeting and any signs that have poor retroreflectivity. Additionally, replace all STOP signs that have dimensions less than 30”x30”. SDDCTEA can assist with sign compliance by conducting a Sign Management Study if necessary.

SHORT-TERM IMPROVEMENTS

Hoadley Road and Dollarway Road

Photo	Deficiency/Corrective Action
	Deficiencies: The YIELD signs and DO NOT ENTER signs are mounted back-to-back on the same post for each intersection approach. This blocks the silhouette of the YIELD sign which makes it more difficult to identify. **Corrective Actions:** Mount each sign on its own separate breakaway post.
	Deficiencies: Different KEEP RIGHT signs are used for the eastbound and westbound approaches. Each sign is mounted back-to-back with an additional KEEP RIGHT sign to face each directional of travel. Consistent KEEP RIGHT signs should be used for the entire intersection. **Corrective Actions:** Replace the KEEP RIGHT sign shown in the bottom photo with a R4-7 sign. R4-7 Mount the KEEP RIGHT signs on their own separate breakaway post and install on the nose of the median in the direction which vehicles are traveling.

Photo	Deficiency/Corrective Action
	Deficiencies: No lane use control signage is used. **Corrective Actions:** Install lane use control signage on the signal mast arms and in advance of the intersection for the northbound and southbound approaches. The northbound approach signs show a left, through, and right turn movement. The southbound approach should show a left and a shared through/right turn movement.
	Deficiencies: Pavement markings are faded throughout the intersection. **Corrective Actions:** Restripe the faded pavement markings for proper visibility.
	Deficiencies: No stop lines are present for each approach lane. **Corrective Actions:** Stripe a stop bar for each approach lane to indicate the point behind which vehicles are required to stop for the traffic signal.

SHORT-TERM IMPROVEMENTS

Hoadley Road and Dollarway Road

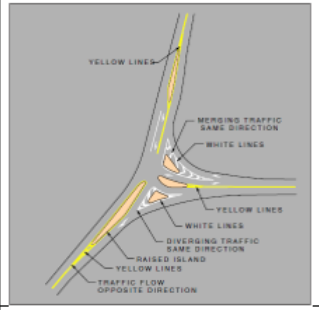
Photo	Deficiency/Corrective Action
	Deficiencies: Curb cuts are present on the southern leg where pedestrian crossing is not permitted. **Corrective Actions:** Remove the curb cuts. Pedestrian crossing is not permitted at these locations.
	Deficiencies: Medians are not flush. **Corrective Actions:** An example of a flushed median is shown below. Hatching should be oriented such that it directs a vehicle back into its desired travel lane. 
	Deficiencies: A YIELD sign is used for the channelized right turn on the eastbound approach. **Corrective Actions:** Remove the YIELD sign. This is a free movement since the eastbound channelized right turn lane joins an added lane.

Photo	Deficiency/Corrective Action
	Deficiencies: Multiple turn radii are too tight to accommodate commercial vehicles and trucks. **Corrective Actions:** Slightly modify the turn radii and remove the median islands at the eastbound and westbound approaches as shown in the photo.

Photo

SHORT-TERM

Hoadley Road and Sibert Road

Photo	Deficiency/Corrective Action
	Deficiencies: The westbound approach STOP sign has a WELCOME sign mounted below. **Corrective Actions:** Remove the WELCOME sign that supplements the eastbound approach STOP sign since it is not related to the regulatory STOP sign.
	Deficiencies: The TRUCK ROUTE sign is faded and is mounted too low which makes it difficult to read. **Corrective Actions:** Replace the TRUCK ROUTE sign with a new Type III sheeting TRUCK ROUTE sign that is 24"x18" and is mounted to a height of at least 5 feet.

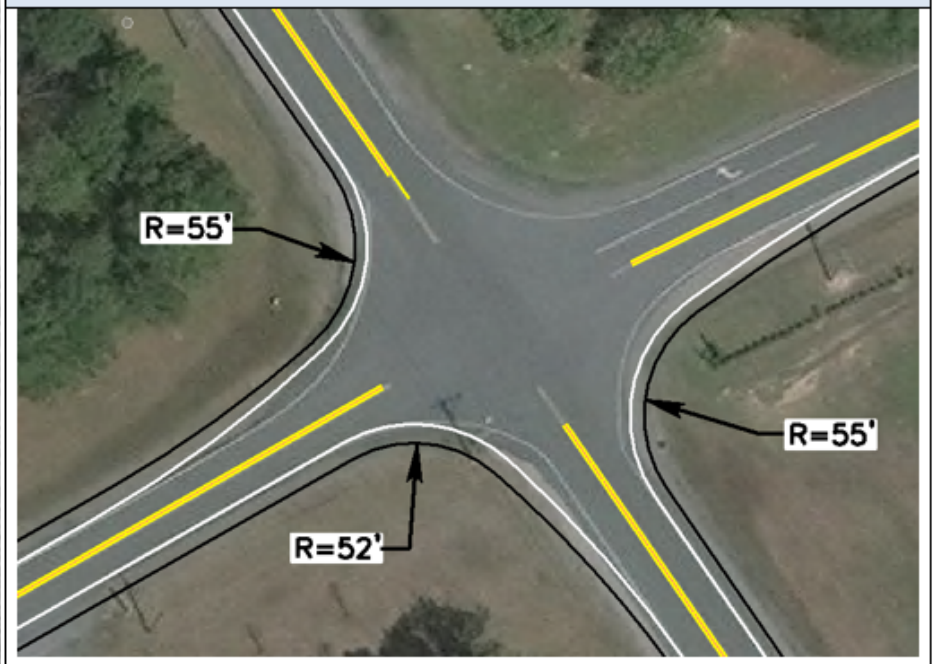
Photo	Deficiency/Corrective Action
	Deficiencies: The text on the wayfinding sign is difficult to read since it is faded and is less than the minimum text height. There are also too many locations. **Corrective Actions:** Replace the sign with multiple wayfinding signs that have a maximum of three destinations. Ensure the wayfinding signs are up to date. Section 2D.06 of the MUTCD states that on low-volume roads with speeds of 25 mph or less, and on urban streets with speeds of 25 mph or less, the principal legend shall be in letters at least 4 inches in height for all upper-case letters, or a combination of 4 inches in height for upper-case letters and 3 inches in height for lower-case letters.
	Deficiencies: The arrow marking is broken and faded. **Corrective Actions:** Restripe the arrow marking.

SHORT-TERM

Hoadley Road and Sibert Road

Deficiency/Corrective Action
Deficiencies: Multiple turn radii are too tight to accommodate commercial vehicles and trucks. **Corrective Actions:** Slightly modify the turn radii and remove the median islands at the eastbound and westbound approaches as shown in the photo.

Photo



SHORT-TERM IMPROVEMENTS

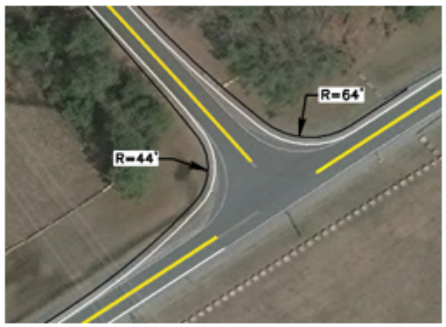
Wise Road and Dollarway Road

Photo	Deficiency/Corrective Action
	Deficiencies: There is a slight shoulder drop-off on the northbound approach. **Corrective Actions:** Backfill the shoulder area to create a smooth transition from roadway to shoulder.
	Deficiencies: A STOP sign is used on the left-hand side of the roadway for the westbound approach. **Corrective Actions:** Remove this STOP sign. A STOP sign is not needed on the left-hand side of the roadway in this situation. Instead, increase the right-hand side STOP sign to a size of 48"x48" and install a red, vertical retroreflective strip on the post to increase conspicuity.
	Deficiencies: Multiple turn radii are too tight to accommodate commercial vehicles and trucks. **Corrective Actions:** Modify the turn radii as shown in the photo. It should be noted that if the commercial vehicle inspection area is relocated to the Plainview Gate, the radii improvements will not be needed.

Photo	Deficiency/Corrective Action
	Deficiencies: No lane use arrow markings are used for the westbound approach. **Corrective Actions:** Install compliant lane use arrow markings for the left and right turn lanes as shown below. **B - Turn Lane-Use Arrow** 8.0 ft OR

SHORT-TERM IMPROVEMENTS

Wise Road and Atkisson Road

Photo	Deficiency/Corrective Action
	Deficiencies: The swing gate is not properly delineated. **Corrective Actions:** The swing gate should be delineated with horizontal panels with retroreflective, alternating, vertical red/white stripes. Install a ROAD CLOSED sign mounted on the gate. Delineate the post since it is located within the clear zone.
	Deficiencies: There is a significant shoulder drop-off for vehicles making a right turn from Atkisson Road. **Corrective Actions:** Backfill the shoulder area so vehicles can avoid this roadside hazard.
	**Deficiencies:** Multiple turn radii are too tight to accommodate commercial vehicles and trucks. **Corrective Actions:** Modify the turn radii as shown in the photo. It should be noted that if the commercial vehicle inspection area is relocated to the Plainview Gate, the radii improvements will not be needed.

SHORT-TERM IMPROVEMENTS

Stark Gate Road and Dollarway Road

Photo	Deficiency/Corrective Action
	Deficiencies: An old post remains that contains no signing and is a fixed object hazard. **Corrective Actions:** Remove the post.
	Deficiencies: There is a slight drop-off from the new driveway to the shoulder on both ends of the driveway. **Corrective Actions:** Backfill the shoulder so that the shoulder is level with the driveway. This will create a smooth transition from shoulder to driveway.
	Deficiencies: The broken, yellow centerline is faded. Passing is permitted near an intersection. **Corrective Actions:** Restripe the centerline for proper visibility. The centerline should be striped as a double yellow centerline since passing should not be permitted near an intersection.

SHORT-TERM IMPROVEMENTS

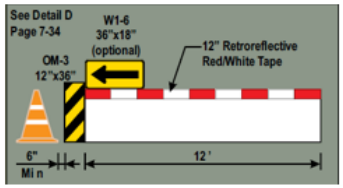
Romer Road and Hanlon Road

Photo	Deficiency/Corrective Action
	Deficiencies: The STOP sign is mounted too low, is not retroreflective, and is mounted on a fixed post. **Corrective Actions:** Replace the STOP sign with one that uses Type III sheeting or better and mount the sign to a height of at least 5 feet on a breakaway post.
	Deficiencies: The light pole is located within the clear zone of the roadway. **Corrective Actions:** Ideally the light pole should be relocated out of the clear zone of the roadway. In the short-term, the light pole can be delineated with an OM3-R object marker. OM-3R

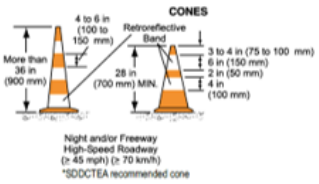
SHORT-TERM IMPROVEMENTS

Plainview Gate

Photo	Deficiency/Corrective Action
	Deficiencies: The STOP AHEAD sign used in the approach zone is not compliant. The STOP AHEAD sign conveys the wrong message to drivers since they are approaching an ID checkpoint. **Corrective Actions:** Install a CHECKPOINT (W3-10A-TEA) sign supplemented by an AHEAD plaque (W16-9P). W3-10a-TEA with W16-9P

Photo	Deficiency/Corrective Action
	Deficiencies: The Visitor's sign is faded and is not legible. **Corrective Actions:** Replace the sign with a new Visitor's sign that uses white lettering on a green or brown background. The text size of the lettering should be at least 6 inch in height for upper-case letters and 4.5 inches in height for lower-case letters.
	Deficiencies: The concrete barriers in the approach zone are not properly delineated for both the inbound and outbound lanes. **Corrective Actions:** Reevaluate the need for concrete barriers in the approach zone. If the barriers do remain, signs and delineation should be installed per SDDCTEA Pamphlet 55-15, Exhibit 7.13. 

SHORT-TERM IMPROVEMENTS

Photo	Deficiency/Corrective Action
	Deficiencies: Czech hedgehogs, barriers, and planters are used in the approach zone to prevent vehicles from ramming into the gatehouse through the fencing. **Corrective Actions:** It is recommended to remove the Czech hedgehogs and planters and to ensure that the fencing and swing gates are reinforced. The barriers can remain but should create a chicane in accordance with SDDCTEA Pamphlet 55-15 Chapter 7.
	Deficiencies: Traffic cones used throughout the gate area not properly delineated and seem to serve no purpose. **Corrective Actions:** It is recommended to remove the traffic cones. If the cones must remain, utilize compliant traffic cones according to MUTCD standards. 

Plainview Gate

Photo	Deficiency/Corrective Action
	Deficiencies: No gate closure signage is used. **Corrective Actions:** Install gate closure signage and horizontal panels with retroreflective, alternating, vertical red/white stripes as shown below.
	Deficiencies: A STOP sign is used at the ID check area. **Corrective Actions:** Remove the STOP sign. In the case of an ID check area, the guards function as the traffic control device.

SHORT-TERM IMPROVEMENTS

Plainview Gate

Photo	Deficiency/Corrective Action
	Deficiencies: Several signs throughout the gate area are mounted on fixed posts. **Corrective Actions:** Replace all fixed posts with breakaway posts since they lessen the impact to a vehicle if struck.
	Deficiencies: Boulders are used in the response zone to create a contiguous passive barrier. **Corrective Actions:** In accordance with the ACP Standard Design Section 1.9.2.5 boulders are not on the approved list for passive barrier use. The boulders should be replaced with an approved type of passive barrier.
	Deficiencies: The POST SPEED LIMIT sign is faded and has poor sheeting. **Corrective Actions:** Install a new POST SPEED LIMIT sign that uses Type III sheeting or better.

Photo	Deficiency/Corrective Action
	Deficiencies: The GATE EXIT SPEED sign is non-compliant. **Corrective Actions:** Install a CHECKPOINT (W3-10A-TEA) sign supplemented by an AHEAD plaque (W16-9P). W3-10a-TEA with W16-9P
	Deficiencies: Two arrow signs are turned away from the road and don't seem to be needed. **Corrective Actions:** Remove the signs.

SHORT-TERM IMPROVEMENTS

Plainview Gate

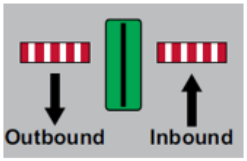
Photo	Deficiency/Corrective Action
	Deficiencies: The AVBs are not properly striped. **Corrective Actions:** Replace the old markings with alternating red and white stripes that are aligned in the direction of travel. 
	Deficiencies: Parking stoppers are used in front of the BARRIER sign. **Corrective Actions:** Remove the stoppers since they do not effectively redirect a vehicle away from the fixed object. Ideally the sign should be relocated out of the clear zone on a breakaway post. At a minimum, delineate the sign with an OM3-R object marker. OM-3R

Photo	Deficiency/Corrective Action
	Deficiencies: Pavement markings in the response zone are faded. **Corrective Actions:** Restripe the faded pavement markings for proper visibility.

SHORT-TERM IMPROVEMENTS

Dexter Gate

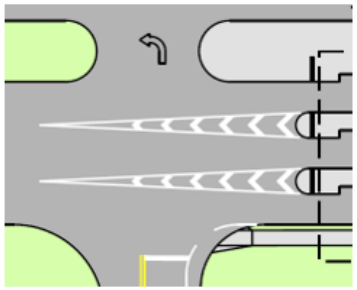
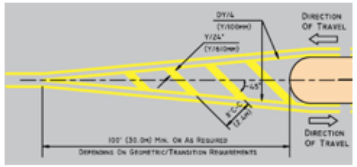
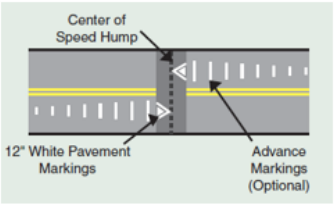
Photo	Deficiency/Corrective Action
	Deficiencies: The obstruction markings between the inbound and outbound lanes are not compliant and are the improper color. **Corrective Actions:** Install white obstruction markings at the nose of the median in the approach and response zones between the 2 inbound lanes and between the 2 outbound lanes in accordance to Section 6 of the SDDCTEA Pamphlet 55-15 as shown in the top photo. The obstruction markings separating the inbound lanes from the outbound lanes should be hatched as show in the bottom photo.  

Photo	Deficiency/Corrective Action
	Deficiencies: Several of the barrels used in the approach zone to create a chicane and the barrels are not retroreflective. **Corrective Actions:** It is recommended to remove the barrels. If the barrels are desired to remain, upgrade all barrel delineation to allow for full visibility of the barrels during nighttime hours. If the intent of the barrels is to slow non-threat vehicles down, replace the barrels with speed humps and proper signage. 
	Deficiencies: The YIELD sign used between the two outbound lanes is mounted on a temporary post and it is confusing to which lane has the right-of-way. **Corrective Actions:** Remove the sign and install a YIELD sign on the far right-hand side of the roadway at the merging point of the two-outbound lane. This will allow the inside outbound lane to have the right-of-way. The YIELD sign should be mounted on a permanent breakaway post.

SHORT-TERM IMPROVEMENTS

Dexter Gate

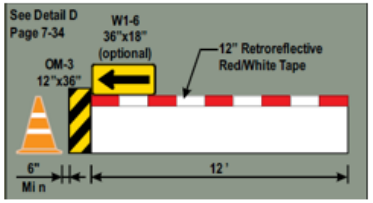
Photo	Deficiency/Corrective Action
	Deficiencies: The plastic barriers used in the approach zone are not properly delineated. **Corrective Actions:** Reevaluate the need for plastic barriers in the approach zone. If the barriers do remain, signs and delineation should be installed per SDDCTEA Pamphlet 55-15, Exhibit 7.13. 
	Deficiencies: A STOP sign is used at the ID check area. **Corrective Actions:** Remove the STOP sign. In the case of the ID check area, the guards function as the traffic control device.

Photo	Deficiency/Corrective Action
	Deficiencies: The POST SPEED LIMIT sign is faded and has poor sheeting. **Corrective Actions:** Install a new POST SPEED LIMIT sign that uses Type III sheeting or better.
	Deficiencies: Pavement markings are faded throughout the gate area. **Corrective Actions:** Restripe the faded pavement markings.
	Deficiencies: Signs throughout the response zone are mounted on fixed posts. **Corrective Actions:** Replace all fixed posts with breakaway posts which lessen the impact to vehicle if struck.

SHORT-TERM IMPROVEMENTS

Dexter Gate

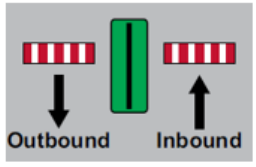
Photo	Deficiency/Corrective Action
	Deficiencies: The swing gate at the first internal intersection remains open which creates a non-contiguous perimeter. Non-contiguous passive barrier is also used in the response zone. **Corrective Actions:** Close the gate and upgrade passive barrier to create a contiguous perimeter. Refer to UFC 4-022-01 for additional details relating to compliant passive barrier.
	Deficiencies: The AVBs are not properly delineated. **Corrective Actions:** Replace the old markings with alternating red and white stripes that are aligned vertically in the direction of travel. 

Photo	Deficiency/Corrective Action
	Deficiencies: The GATE EXIT SPEED sign is non-compliant. **Corrective Actions:** Install a CHECKPOINT (W3-10A-TEA) sign supplemented by an AHEAD plaque (W16-9P). **W3-10a-TEA with W16-9P**
	Deficiencies: No gate closure signage is used. **Corrective Actions:** Install gate closure signage and horizontal panels with retroreflective, alternating, vertical red/white stripes as shown below.

SHORT-TERM IMPROVEMENTS

Stark Gate

Photo	Deficiency/Corrective Action
	Deficiencies: Several barriers are used in the approach zone and at the ID check area. They are fixed object hazards and are not properly delineated. **Corrective Actions:** Remove the barriers. If they must remain, properly delineate the barriers in accordance with SDDCTEA Pamphlet 55-15.
	Deficiencies: Several of the barrels used in the approach and response zones are not retroreflective. **Corrective Actions:** Upgrade all barrel delineation to allow for full visibility of the barrels during nighttime hours.

Photo	Deficiency/Corrective Action
	Deficiencies: No gate closure signage is used. **Corrective Actions:** Install gate closure signage and horizontal panels with retroreflective, alternating, vertical red/white stripes as shown below.
	Deficiencies: A STOP sign is used at the ID check area. **Corrective Actions:** Remove the STOP sign. Guards function as the traffic control device at the ID check area.

SHORT-TERM IMPROVEMENTS

Stark Gate

Photo	Deficiency/Corrective Action
	Deficiencies: The median painted island is not hatched. **Corrective Actions:** Hatch the median island such that vehicles are directed back into their desired travel lane.
 	Deficiencies: There are two side roads immediately following the ID check area. This creates a non-contiguous perimeter since there are no AVBs or passive barrier to stop a threat vehicle. Vehicles can proceed into the base through these two side roads. **Corrective Actions:** It is recommended to gate off these side roads or realign them so that they can be accessed after the AVBs.

Photo	Deficiency/Corrective Action
	Deficiencies: A bollard is in the clear zone of the outbound lane and is a roadside hazard. **Corrective Actions:** Remove the bollard.
	Deficiencies: The GATE EXIT SPEED sign is not compliant. **Corrective Actions:** Install a CHECKPOINT (W3-10A-TEA) sign supplemented by an AHEAD plaque (W16-9P). W3-10a-TEA with W16-9P

SHORT-TERM IMPROVEMENTS

Stark Gate

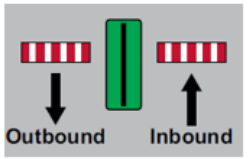
Photo	Deficiency/Corrective Action
	Deficiencies: The AVBs are not properly delineated. **Corrective Actions:** Replace the old markings with alternating red and white stripes that are aligned vertically in the direction of travel. 
	Deficiencies: There is no stop bar to supplement the STOP HERE ON RED sign. **Corrective Actions:** Install a stop bar adjacent to the STOP HERE ON RED sign for both the inbound and outbound lane.
	Deficiencies: The 35-mph speed limit sign is too small and is not retroreflective. **Corrective Actions:** Replace the speed limit sign with a 24”x30” sign that uses Type III sheeting or better.

Photo	Deficiency/Corrective Action
	Deficiencies: The STOP AHEAD sign used in the approach zone is not compliant. The STOP AHEAD sign conveys the wrong message to drivers since they are approaching an ID checkpoint. **Corrective Actions:** Install a CHECKPOINT (W3-10A-TEA) sign supplemented by an AHEAD plaque (W16-9P). W3-10a-TEA with W16-9P

ECF RECOMMENDATIONS – LANE CALCS

Lane Calculation Summary

Currently the installation has three operational ACPs. The installation has also developed an Area Development Plan which has the commercial vehicle inspection area to be relocated to the Plainview Gate which is important due to this area being considered a site for the Joint Chemical Biological Defense Logistics Center. The installation also mentioned the possibility of consolidating gates to reduce the required manpower needed. Therefore, the study team will provide recommendations with required lane calculations and manpower for these multiple scenarios.

ECF RECOMMENDATIONS – LANE CALCS

Lane Calculation Summary-Scenario 1

The first scenario is an existing scenario where all three gates remain open but the commercial vehicle inspection area is relocated to the Plainview Gate.

ACP	Existing ID Check Lanes	Existing Demand Volume	Required ID Check Lanes					
			Single Manual Processing	Tandem Manual Processing	Single Handheld Processing	Tandem Handheld Processing	AIE Processing (No Arms)	AIE Processing (With Arms)
Plainview Gate	1	252	1	1	1	1	1	1
Dexter Gate	2	200	1	1	1	1	1	1
Stark Gate	1	184	1	1	1	1	1	1

ECF RECOMMENDATIONS – LANE CALCS

Lane Calculation Summary-Scenario 2

The second scenario includes the relocation of the commercial vehicles inspection area with the closure of the Stark Gate to help reduce the required manpower

ACP	Existing ID Check Lanes	Existing Demand Volume	Required ID Check Lanes					
			Single Manual Processing	Tandem Manual Processing	Single Handheld Processing	Tandem Handheld Processing	AIE Processing (No Arms)	AIE Processing (With Arms)
Plainview Gate	1	252	1	1	1	1	1	1
Dexter Gate	2	384	2	1	2	1	1	2

ECF RECOMMENDATIONS – LANE CALCS

Lane Calculation Summary-Scenario 3

The third scenario includes consolidating the ACPs into one location where both POVs and commercial vehicles will enter the installation from

ACP	Existing ID Check Lanes	Existing Demand Volume	Required ID Check Lanes					
			Single Manual Processing	Tandem Manual Processing	Single Handheld Processing	Tandem Handheld Processing	AIE Processing (No Arms)	AIE Processing (With Arms)
Combined Gate	NA	636	2	2	2	2	2	2

ECF RECOMMENDATIONS – MANPOWER

The following table shows manpower requirements for the required number of lanes for each scenario. Note that the personnel numbers do not consider inspection staff, pedestrian processing staff, or staff inside the gatehouse

Scenario	Required Manpower
Scenario 1	4
Scenario 2	4
Scenario 3	3

NEXT STEPS

- Outbrief/Draft report submittal
  - Installation 15-day review period following submittal
- Draft final report in Early September
  - 15-day review period following submittal of Draft Final
- Final report in mid October

- Final report will:
  - Be full color
  - Address comments
  - Include final concept drawings, cost estimates and threat calculations
  - Will include photos of deficiencies along with suggested improvements

- Questions?

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SDDC

WHAT WE BRING TO THE FIGHT...

9 BRIGADES GEOGRAPHICALLY LOCATED TO SUPPORT COMBATANT COMMANDERS

OUR NATION'S STRATEGIC AMMUNITION PORTS

GLOBALLY POSTURED TO PROVIDE ABILITY FOR THE WARFIGHTER

IT'S ALL ABOUT THE WARFIGHTER

U.S.ARMY

TRUSTED PROFESSIONALS...DELIVERING READINESS AND LETHALITY!

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APPENDIX H

SDDCTEA PUBLICATIONS

(Electronic Copy Only)

APPENDIX I
FIRE HYDRANT FLOW TEST

Form 12

Private Fire Service Mains
Hydrant flow Test Report

Name of Property: Pine Bluff Arsenal

Address: Pine Bluff, Arkansas 71602

Tested by: William Burrus **Date:** 06-04/2024

Contact # William.Burrus@hdrinc.com **Time:** 2:00 PM

Weather conditions: 82 degrees, Cloudy, Wind - 5 MPH Northwest, Humidity - 60%

Location of test: Pine Bluff Arsenal, Plainview Gate

Residual hydrant location: See Map

Flow hydrant(s) location: See Map

Static pressure (residual hydrant) 48 psi (bar) **Test Equipment:** Gauges - New England Manufacturing Company

Residual pressure (residual hydrant) 32 psi (bar) **Test Equipment Calibration Date:** 5/20/24 (see attached calibration records)

Nozzle size (flow hydrant) 2.50 inches in (mm)

Nozzle coefficient (flow hydrant) Rounded - 0.90 (see attached flow test chart)

Pitot pressure(s) 26 psi (bar) (856 gpm)

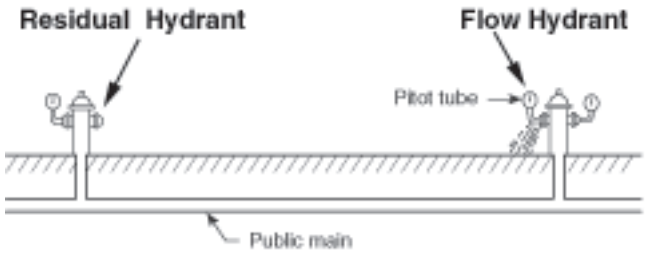
Projected results: 1,157 gpm (lpm) @ 20 psi (1.4 bar)

Remarks:

One 2.50 in. Diffuser. Pitot flowed 856 gpm with Pitot Pressure of 26 psi. A Static Pressure of 48 psi was reduced to 32 psi during the flow test.

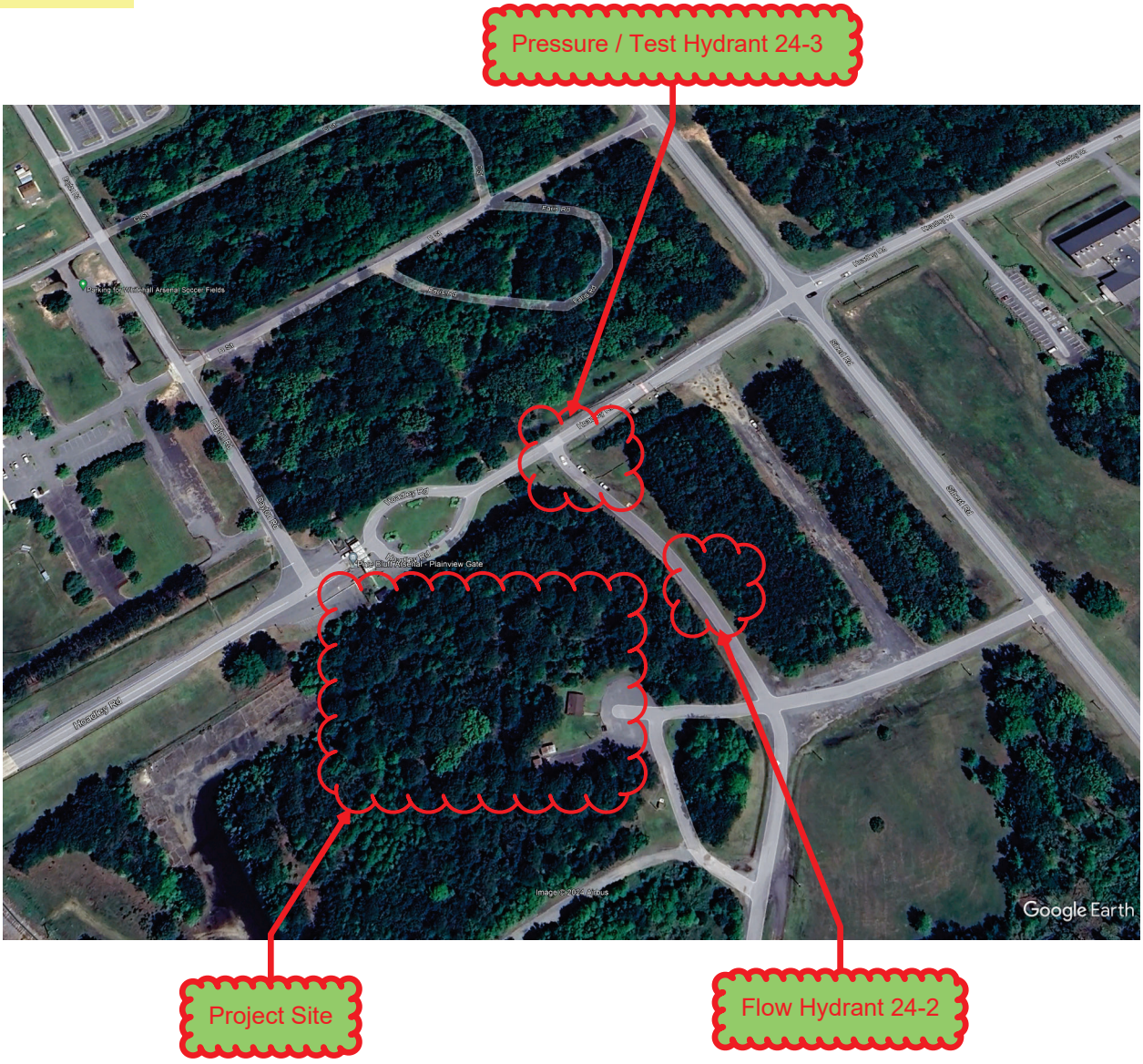
- Gauges were calibrated on May 20, 2024 (Calibration Report Numbers 29437 (flow gauge) and 29441 (pressure gauge).

Pollard Water Discharge Chart



Attendees	Organization	Email	Contact #
William Burrus, PE, Sr. Fire Protection Engineer	HDR	william.burrus@hdrinc.com	210-841-2920
Phillip Tallent, Fire Plans Examiner	PBA Fire	phillip.a.tallent.civ@army.mil	870-540-4012
David Weiss, Captain	PBA Fire	David.L.Weiss.civ@army .mil	870-540-4012

^ NORTH ^



FLOW CHART (0.90 COEFFICIENT)

Posted July 2021 on MeyerFire.com. For more fire protection resources visit www.meyerfire.com/subscribe.

FLOW CHART: FLOW (GPM) USING A 0.90 DISCHARGE COEFFICIENT

PITOT	VEL	OUTLET SIZE (INCHES)																	
PSI	FEET	FT/S	1	1-1/8	1-1/4	1-1/2	1-3/4	2	2-1/4	2-3/8	2-1/2	2-5/8	2-3/4	3	3-1/4	3-1/2	3-3/4	4	4-1/2
1	2.3	12.2	26.8	34.0	41.9	60.4	82.2	107	136	151	168	185	203	242	284	329	378	430	544
2	4.6	17.2	38.0	48.1	59.3	85.4	116	152	192	214	237	262	287	342	401	465	534	607	769
3	6.9	21.1	46.5	58.9	72.7	105	142	186	235	262	291	320	352	419	491	570	654	744	942
4	9.2	24.4	53.7	68.0	83.9	121	164	215	272	303	336	370	406	483	567	658	755	859	1,087
5	12	27.3	60.0	76.0	94	135	184	240	304	339	375	414	454	540	634	735	844	961	1,216
6	14	29.9	65.8	83.2	103	148	201	263	333	371	411	453	497	592	695	806	925	1,052	1,332
7	16	32.3	71.0	90	111	160	218	284	360	401	444	489	537	639	750	870	999	1,136	1,438
8	18	34.5	75.9	96	119	171	233	304	384	428	475	523	574	683	802	930	1,068	1,215	1,538
9	21	36.6	80.5	102	126	181	247	322	408	454	503	555	609	725	851	987	1,133	1,289	1,631
10	23	38.6	84.9	107	133	191	260	340	430	479	531	585	642	764	897	1,040	1,194	1,358	1,719
11	25	40.4	89.0	113	139	200	273	356	451	502	557	614	673	801	941	1,091	1,252	1,425	1,803
12	28	42.2	93	118	145	209	285	372	471	525	581	641	703	837	982	1,139	1,308	1,488	1,883
13	30	44.0	97	123	151	218	296	387	490	546	605	667	732	871	1,022	1,186	1,361	1,549	1,960
14	32	45.6	100	127	157	226	308	402	509	567	628	692	760	904	1,061	1,231	1,413	1,607	2,034
15	35	47.2	104	132	162	234	318	416	526	587	650	716	786	936	1,098	1,274	1,462	1,664	2,106
16	37	48.8	107	136	168	242	329	430	544	606	671	740	812	966	1,134	1,316	1,510	1,718	2,175
17	39	50.3	111	140	173	249	339	443	560	624	692	763	837	996	1,169	1,356	1,557	1,771	2,242
18	42	51.7	114	144	178	256	349	456	577	642	712	785	861	1,025	1,203	1,395	1,602	1,822	2,307
19	44	53.1	117	148	183	263	358	468	592	660	731	806	885	1,053	1,236	1,434	1,646	1,872	2,370
20	46	54.5	120	152	188	270	368	480	608	677	750	827	908	1,081	1,268	1,471	1,688	1,921	2,431
22	51	57.2	126	159	197	283	386	504	637	710	787	868	952	1,133	1,330	1,543	1,771	2,015	2,550
24	55	59.7	132	166	206	296	403	526	666	742	822	906	995	1,184	1,389	1,611	1,850	2,104	2,663
26	60	62.2	137	173	214	308	419	548	693	772	856	943	1,035	1,232	1,446	1,677	1,925	2,190	2,772
28	65	64.5	142	180	222	320	435	568	719	801	888	979	1,074	1,279	1,501	1,740	1,998	2,273	2,877
30	69	66.8	147	186	230	331	450	588	744	829	919	1,013	1,112	1,323	1,553	1,801	2,068	2,353	2,978
32	74	69.0	152	192	237	342	465	607	769	857	949	1,046	1,149	1,367	1,604	1,860	2,136	2,430	3,075
34	79	71.1	157	198	245	352	479	626	793	883	978	1,079	1,184	1,409	1,653	1,918	2,201	2,505	3,170
36	83	73.1	161	204	252	362	493	644	815	909	1,007	1,110	1,218	1,450	1,701	1,973	2,265	2,577	3,262
38	88	75.2	165	209	259	372	507	662	838	934	1,034	1,140	1,252	1,489	1,748	2,027	2,327	2,648	3,351
40	92	77.1	170	215	265	382	520	679	860	958	1,061	1,170	1,284	1,528	1,793	2,080	2,388	2,717	3,438
42	97	79.0	174	220	272	391	533	696	881	981	1,087	1,199	1,316	1,566	1,838	2,131	2,447	2,784	3,523
44	102	80.9	178	225	278	401	545	712	902	1,004	1,113	1,227	1,347	1,603	1,881	2,182	2,504	2,849	3,606
46	106	82.7	182	230	285	410	558	728	922	1,027	1,138	1,255	1,377	1,639	1,923	2,231	2,561	2,913	3,687
48	111	84.5	186	235	291	419	570	744	942	1,049	1,163	1,282	1,407	1,674	1,965	2,279	2,616	2,976	3,767
50	116	86.2	190	240	297	427	581	759	961	1,071	1,186	1,308	1,436	1,709	2,005	2,326	2,670	3,037	3,844
52	120	87.9	194	245	302	436	593	774	980	1,092	1,210	1,334	1,464	1,742	2,045	2,372	2,722	3,098	3,920
54	125	89.6	197	250	308	444	604	789	999	1,113	1,233	1,359	1,492	1,776	2,084	2,417	2,774	3,157	3,995
56	129	91.2	201	254	314	452	615	804	1,017	1,133	1,256	1,384	1,519	1,808	2,122	2,461	2,825	3,214	4,068
58	134	92.8	204	259	319	460	626	818	1,035	1,153	1,278	1,409	1,546	1,840	2,160	2,505	2,875	3,271	4,140
60	139	94.4	208	263	325	468	637	832	1,053	1,173	1,300	1,433	1,573	1,872	2,197	2,547	2,924	3,327	4,211

Pressure Hydrant 24-3

5/20/2024

Calibration Report # 29441

Tag: 0-160psi BRNEM 203	**Pressure Range:** 0-160psi	**Customer:** HDR
Model: 3.2" Dry Stabilizer	**Serial #:**	**Contact:** Russell Miller
Manufacturer: Blue Ribbon	**Accuracy Percent of Range** 1.00	
	Calibration Date: 5/20/2024	

Test EQ Manufacturer: Ashcroft (-30-0-300 PSI)		**% Accuracy** 0.050	**Last N.I.S.T. Certification:**	5/15/2024
Mod #: 302089SD02LV&300#	**Serial #:** 1307310		**Ambient Temperature:**	72 degrees

☑ As Found ☑ As Left ☑ Pass ☐ Fail

Step	Target	Actual	Variance	% Error	Pass ?
1	0.00	0.00	0.000	0.000	Yes
2	40.00	41.31	1.310	0.819	Yes
3	80.00	80.94	0.940	0.587	Yes
4	120.00	121.02	1.020	0.637	Yes
5	160.00	161.51	1.510	0.944	Yes

Acceptable Range

-1.600 to 1.600

Calibrated By: T. W. Bennett

New England Manufacturing, LLC
47 Industrial Park Road Unit D
Romney, WV 26757
(304) 822-8011

Flow Hydrant - 24-2

5/20/2024

Calibration Report # 29437

Tag: 0-100psi BRNEM 203	**Pressure Range:** 0-100psi	**Customer:** HDR
Model: 3.2" Dry Stabilizer	**Serial #:**	**Contact:** Russell Miller
Manufacturer: Blue Ribbon	**Accuracy Percent of Range** 1.00	
	Calibration Date: 5/20/2024	

Test EQ Manufacturer: Ashcroft (-30-0-300 PSI)		**% Accuracy**	0.050	**Last N.I.S.T. Certification:**	5/15/2024
Mod #: 302089SD02LV&300#	**Serial #:**	1307310		**Ambient Temperature:**	72 degrees

☑ As Found ☑ As Left ☑ Pass ☐ Fail

Step	Target	Actual	Variance	% Error	Pass ?
1	0.00	0.00	0.000	0.000	Yes
2	20.00	20.29	0.290	0.290	Yes
3	40.00	40.46	0.460	0.460	Yes
4	60.00	60.74	0.740	0.740	Yes
5	80.00	80.90	0.900	0.900	Yes
6	100.00	100.96	0.960	0.960	Yes

Acceptable Range

-1.000 to 1.000

Calibrated By: T. W. Bennett

New England Manufacturing, LLC
47 Industrial Park Road Unit D
Romney, WV 26757
(304) 822-8011

APPENDIX J
UPDATED CENTER OF STANDARDIZATION ARMY ACP STANDARD DESIGN DRAWINGS

US Army Corps
of Engineers®
OMAHA DISTRICT

ARMY ACCESS CONTROL POINT (ACP)
STANDARD DESIGN
VARIOUS LOCATIONS

SOLICITATION NO.:
CONTRACT NO.:
ISSUE DATE: AUGUST 2025

THIS PROJECT WAS DESIGNED BY THE OMAHA DISTRICT OF THE US ARMY CORPS OF ENGINEERS. THE INITIALS OR SIGNATURES AND REGISTRATION DESIGNATIONS OF INDIVIDUALS APPEAR ON THESE PROJECT DOCUMENTS WITHIN THE SCOPE OF THEIR EMPLOYMENT AS REQUIRED BY ER 1110-1-8152.

THE FOLLOWING SIGNATURES BELOW INDICATE OFFICIAL APPROVAL OF ALL DRAWINGS IN THIS SET DATED _____

SUBMITTED BY:	RA
CHIEF: ARCH	SECTION
SUBMITTED BY:	PE
CHIEF: CIVIL	SECTION
SUBMITTED BY:	PE
CHIEF: ELECT	SECTION
SUBMITTED BY:	PE
CHIEF: ENVIR	SECTION
SUBMITTED BY:	PE
CHIEF: MECH	SECTION
SUBMITTED BY:	PE
CHIEF: STRUCT/INTER	SECTION
SUBMITTED BY:	PE
CHIEF: GEOT	SECTION
SUBMITTED BY:	CADD
	PROJECT COORD.

US Army Corps
of Engineers
Omaha District

US Army Corps
of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
SUBMITTED BY:
SIZE: ANSI D
ISSUE DATE: AUGUST 2025
SOLICITATION NO.:
CONTRACT NO.:
FILE NUMBER:
FILENAME: COS-ACP-G-001.DWG

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE
OMAHA, NE 68102

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

COVER SHEET

SHEET ID
G-001

INDEX

GENERAL

DESIGN FILE	SHEET NO.	DESCRIPTION
COS-ACP-G-001.DWG	G-001	COVER SHEET
COS-ACP-G-002.DWG	G-002	INDEX

CIVIL/SITE

DESIGN FILE	SHEET NO.	DESCRIPTION
COS-ACP-C-001.DWG	C-001	GENERAL NOTES
COS-ACP-C-301.DWG	C-301	SITE PLAN-PRIMARY ACP WITH VCC AND COMMERCIAL VEHICLE ACCESS
COS-ACP-C-302.DWG	C-302	SITE PLAN-PRIMARY/SECONDARY ACP WITH VCC
COS-ACP-C-303.DWG	C-303	SITE PLAN-PRIMARY/SECONDARY ACP WITHOUT VCC
COS-ACP-C-304.DWG	C-304	SITE PLAN-LIMITED USE ACP
COS-ACP-C-901.DWG	C-901	SITE PLAN-ACP DETAILS
COS-ACP-C-902.DWG	C-902	SITE PLAN-TYPICAL SECTIONS
COS-ACP-C-903.DWG	C-903	SITE PLAN-GATES AND FENCES
COS-ACP-C-904.DWG	C-904	SITE PLAN-PAVEMENT MARKING DETAILS

ARCHITECTURAL

DESIGN FILE	SHEET NO.	DESCRIPTION
COS-ACP-A-101CS.RVT	A-101CS	CONCEPTUAL COMMAND & CONTROL W/ SEARCH FLOOR PLAN
COS-ACP-A-101GB.RVT	A-101GB	CONCEPTUAL GUARD BOOTH AND PEDESTRIAN ID CHECK LAYOUT
COS-ACP-A-101GH.RVT	A-101GH	CONCEPTUAL GATEHOUSE LAYOUT
COS-ACP-A-101ID.RVT	A-101ID	CONCEPTUAL ID CHECK LAYOUT
COS-ACP-A-101O.RVT	A-101O	CONCEPTUAL OVERWATCH & OVERWATCH W/ COMMAND & CONTROL LAYOUT
COS-ACP-A-101POV.RVT	A-101POV	CONCEPTUAL CONCEPTUAL PASSENGER VEHICLE SEARCH CANOPY LAYOUT
COS-ACP-A-101S1.RVT	A-101S1	CONCEPTUAL SMALL SEARCH AREA BUILDING LAYOUT
COS-ACP-A-101S2.RVT	A-101S2	CONCEPTUAL LARGE SEARCH AREA BUILDING LAYOUT
COS-ACP-A-201S2.RVT	A-201S2	CONCEPTUAL LARGE SEARCH AREA BUILDING ELEVATIONS
COS-ACP-A-101T.RVT	A-101T	CONCEPTUAL TRUCK SEARCH AREA CANOPY LAYOUT
COS-ACP-A-101V2.RVT	A-101V2	CONCEPTUAL 2 PROCESSOR VISITOR CONTROL CENTER LAYOUT
COS-ACP-A-101V3.RVT	A-101V3	CONCEPTUAL 3 PROCESSOR VISITOR CONTROL CENTER LAYOUT
COS-ACP-A-101V6.RVT	A-101V6	CONCEPTUAL 6 PROCESSOR VISITOR CONTROL CENTER LAYOUT

INTERIOR

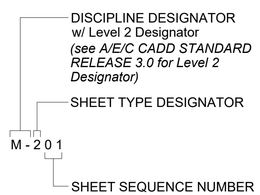
DESIGN FILE	SHEET NO.	DESCRIPTION
COS-ACP-I-101CS.RVT	I-101CS	FURNITURE FLOOR PLAN
COS-ACP-I-101GB.RVT	I-101GB	CONCEPTUAL GUARD BOOTH AND PEDESTRIAN ID CHECK FURNITURE PLAN
COS-ACP-I-101GH.RVT	I-101GH	FURNITURE FLOOR PLAN
COS-ACP-I-101O.RVT	I-101O	FURNITURE FLOOR PLAN
COS-ACP-I-101S1.RVT	I-101S1	FURNITURE FLOOR PLAN
COS-ACP-I-101S2.RVT	I-101S2	FURNITURE FLOOR PLAN
COS-ACP-I-101V2.RVT	A-101V2	FURNITURE FLOOR PLAN
COS-ACP-I-101V3.RVT	A-101V3	FURNITURE FLOOR PLAN
COS-ACP-I-101V6.RVT	A-101V6	FURNITURE FLOOR PLAN

ELECTRICAL

DESIGN FILE	SHEET NO.	DESCRIPTION
ACP-STDE-101.DGN	E-101	DELETED FROM SET
ACP-STDE-102.DGN	E-102	DELETED FROM SET
ACP-STDE-103.DGN	E-103	DELETED FROM SET
ACP-STDE-104.DGN	E-104	DELETED FROM SET
ACP-STDE-105.DGN	E-105	DELETED FROM SET
ACP-STDE-106.DGN	E-106	DELETED FROM SET
ACP-STDE-100O.DGN	E-100O	OVERWATCH AVB OPERATING PANEL PEDESTAL DETAIL
ACP-STDE-101.DGN	E-101	HYBRID BEACON AVB CONTROL PANELS
ACP-STDE-102.DGN	E-102	HYBRID BEACON CONTROL SYSTEM DIAGRAM
ACP-STDE-103.DGN	E-103	HYBRID BEACON CONTROL SEQUENCE AND DETAILS
ACP-STDE-110.DGN	E-110	HIGH EFFICIENCY PRESENCE DETECTION (HEPD) AVB CONTROLPANELS
ACP-STDE-111.DGN	E-111	HIGH EFFICIENCY PRESENCE DETECTION (HEPD) CONTROL SYSTEM DIAGRAM
ACP-STDE-112.DGN	E-112	HIGH EFFICIENCY PRESENCE DETECTION (HEPD) CONTROL SEQUENCE AND DETAILS
ACP-STDE-120.DGN	E-120	HYBRID BEACON AND STOP CONTROL AVB CONTROL PANELS
ACP-STDE-121.DGN	E-121	HYBRID BEACON AND STOP CONTROL SYSTEM DIAGRAM
ACP-STDE-122.DGN	E-122	HYBRID BEACON AND STOP CONTROL SEQUENCE AND DETAILS
ACP-STDE-130.DGN	E-130	STOP CONTROL AVB CONTROL PANELS
ACP-STDE-131.DGN	E-131	STOP CONTROL - CONTROL SYSTEM DIAGRAM
ACP-STDE-132.DGN	E-132	STOP CONTROL - CONTROL SEQUENCE AND DETAILS
ACP-STDE-140.DGN	E-140	FULL CONTAINMENT AVB CONTROL PANELS - MASTER
ACP-STDE-141.DGN	E-141	FULL CONTAINMENT AVB CONTROL PANELS - OTHER PANELS
ACP-STDE-142.DGN	E-142	FULL CONTAINMENT CONTROL SYSTEM DIAGRAM
ACP-STDE-143.DGN	E-143	FULL CONTAINMENT CONTROL SYSTEM DIAGRAMS W/ TRAFFIC ARMS
ACP-STDE-144.DGN	E-144	FULL CONTAINMENT CONTROL SYSTEM DIAGRAMS W/O TRAFFIC ARMS
ACP-STDE-150.DGN	E-150	NEW ISLAND TYPICAL PLAN AND ELEVATION FOR AIE
ACP-STDE-151.DGN	E-151	EXISTING ISLAND TYPICAL PLAN & ELEVATION
ACP-STDE-152.DGN	E-152	AIE FIXED BLOCK DIAGRAM
ACP-STDE-153.DGN	E-153	TYPICAL ISLAND TYPICAL PLAN & ELEVATION FOR AIE & OTHER SYSTEMS
ACP-STDE-154.DGN	E-154	AIE HANDHELD
ACP-STDE-155.DGN	E-155	AIE HANDHELD BLOCK DIAGRAM
ACP-STDE-160.DGN	E-160	CONVENTIONAL SIGNS AND SIGNAL AVB CONTROL PANELS
ACP-STDE-161.DGN	E-161	R/Y/G CONVENTIONAL SIGNS AND SIGNALS CONTROL SYSTEM DIAGRAM
ACP-STDE-162.DGN	E-162	HYBRID BEACON CONVENTIONAL SIGNS AND SIGNALS CONTROL SYSTEM DIAGRAM
ACP-STDE-163.DGN	E-163	CONVENTIONAL SIGNS AND SIGNALS CONTROL SEQUENCE AND DETAILS
ACP-STDE-170.DGN	E-170	HEPD 2015 AVB CONTROL PANELS
ACP-STDE-171.DGN	E-171	HEPD 2015 CONTROL SYSTEM DIAGRAM
ACP-STDE-172.DGN	E-172	HEPD 2015 CONTROL SEQUENCE & DETAILS
ACP-STDEL101.DGN	EL101	LIGHTING PLAN
ACP-STDEP101.DGN	EP101	GENERIC ELECTRICAL PLAN POWER REQUIREMENTS
ACP-STDEY101.DGN	EY101	CCTV CAMERA PLAN
ACP-STDEY102DGN	EY102	AVB BLOCK DIAGRAM

INDEX LEGEND:

1. SHEET IDENTIFICATION NUMBERS:



2. DISCIPLINE DESIGNATORS:

G	GENERAL
H	HAZARDOUS MATERIALS
V	SURVEY / MAPPING
B	GEOTECHNICAL
C	CIVIL
L	LANDSCAPE
S	STRUCTURAL
A	ARCHITECTURAL
I	INTERIORS
Q	EQUIPMENT
F	FIRE PROTECTION
P	PLUMBING
D	PROCESS
M	MECHANICAL
E	ELECTRICAL
T	TELECOMMUNICATIONS
R	RESOURCE

3. SHEET TYPE DESIGNATORS:

0	GENERAL
1	PLANS
2	ELEVATIONS
3	SECTIONS
4	LARGE-SCALE VIEWS
5	DETAILS
6	SCHEDULES & DIAGRAMS
7	USER DEFINED
8	USER DEFINED
9	3D REPRESENTATIONS

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
SUBMITTED BY:
SIZE: ANSI D
ISSUE DATE: AUGUST 2025
SOLICITATION NO.:
CONTRACT NO.:
FILE NUMBER:
FILENAME: COS-ACP-G-002.DWG

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE
OMAHA, NE 68102

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

INDEX

SHEET ID

G-002

REFERENCE CRITERIA

1. DEPARTMENT OF ARMY FACILITIES STANDARDIZATION PROGRAM, ARCHITECTURAL AND ENGINEERING DESIGN CRITERIA, ENGINEERING REGULATION ER 1110-1-113 (LATEST EDITION)
2. FEDERAL HIGHWAY ADMINISTRATION (FHWA), MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), LATEST EDITION
3. FHWA, STANDARD HIGHWAY SIGNS, LATEST EDITION
4. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO), A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS (GREENBOOK), LATEST EDITION
5. AASHTO, ROADSIDE DESIGN GUIDE, LATEST EDITION
6. TRANSPORTATION RESEARCH BOARD (TRB), HIGHWAY CAPACITY MANUAL, LATEST EDITION
7. DEPARTMENT OF DEFENSE, UNIFIED FACILITIES CRITERIA (UFC) ON ENTRY CONTROL FACILITIES/ACCESS CONTROL POINTS; UFC 4-022-01 LATEST EDITION
8. INSTITUTE OF TRANSPORTATION ENGINEERS (ITE), TRAFFIC ENGINEERING HANDBOOK, 1999
9. AASHTO: MANUAL FOR ASSESSING SAFETY HARDWARE (MASH), LATEST EDITION
10. SURFACE DEPLOYMENT AND DISTRIBUTION COMMAND-TRANSPORTATION ENGINEERING AGENCY (SDDC-TEA), TRAFFIC AND SAFETY ENGINEERING FOR BETTER ENTRY CONTROL FACILITIES: SDDCTEA PAMPHLET 55-15

STANDARDS

ARMY INSTALLATION DESIGN STANDARDS (IDS) MAY 2004 - THE PURPOSE OF THESE STANDARDS, AND THIS STANDARD DESIGN PACKAGE, IS TO PROVIDE COMMON FACILITY AND INFRASTRUCTURE STANDARDS FOR ALL ARMY INSTALLATIONS. THE ARMY IDS PROVIDE COMPREHENSIVE STANDARDS IN THE FOLLOWING AREAS THAT THIS STANDARD DESIGN, WHEN IMPLEMENTED, SHALL COMPLY WITH:

- SITE PLANNING DESIGN STANDARDS
- BUILDING DESIGN STANDARDS
- CIRCULATION DESIGN STANDARDS
- LANDSCAPE DESIGN STANDARDS
- SITE ELEMENTS DESIGN STANDARDS
- FORCE PROTECTION DESIGN STANDARDS

1. UNIFIED FACILITIES CRITERIA (UFC) 4-010-01, MINIMUM ANTITERRORISM STANDARDS FOR BUILDING LATEST EDITION
2. NFPA 70, 72, 101, AND 780, LATEST EDITIONS.
3. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA), NATIONAL FIRE CODES (NFC)
4. UNIFIED FACILITIES CRITERIA (UFC)3-210-10 LOW IMPACT DEVELOPMENT
5. UNIFIED FACILITIES CRITERIA (UFC) 1-200-02, HIGH PERFORMANCE AND SUSTAINABLE BUILDING REQUIREMENTS.
6. U.S. DEPT. OF THE ARMY - ARMY STANDARDS FOR ACCESS CONTROL POINTS (ACP), MARCH 2012
7. ARMY ACCESS CONTROL POINT STANDARD DESIGN, LATEST EDITION
8. UNIFIED FACILITIES CRITERIA (UFC) 4-022-02, SELECTION AND APPLICATION OF VEHICLE BARRIERS, LATEST EDITION

ELECTRONIC SECURITY

1. UNIFIED FACILITIES CRITERIA (UFC) 4-021-02 ELECTRONIC SECURITY SYSTEMS
2. UNIFIED FACILITIES GUIDE SPECS (UFGS) 28 10 05 ELECTRONIC SECURITY SYSTEMS (ESS)

ELECTRICAL DESIGN REQUIREMENTS

1. ILLUMINATING ENGINEERING SOCIETY OF NORTH AMERICA (IESNA), GUIDELINE FOR SECURITY LIGHTING FOR PEOPLE PROPERTY AND CRITICAL INFRASTRUCTURE, 2016 G-1-16
2. TECHNICAL MANUAL (TM) 5-811-1/AIR FORCE AFJMAN32-1080, ELECTRICAL POWER SUPPLY AND DISTRIBUTION
3. TECHNICAL INSTRUCTIONS (TI) 811-16, LIGHTING DESIGN
4. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) 70, 72, 101, AND 780, LATEST EDITIONS
5. ANSI C2 NATIONAL ELECTRIC SAFETY CODE, LATEST EDITION
6. UNIFIED FACILITIES CRITERIA (UFC) 3-501-01, ELECTRICAL ENGINEERING
7. UNIFIED FACILITIES GUIDE SPECS (UFGS) UFGS 34 75 13.13 CRASH RATED ACTIVE VEHICLE BARRIERS AND CONTROLS

MECHANICAL DESIGN REQUIREMENTS

1. TI 800-01, TECHNICAL INSTRUCTIONS, DESIGN CRITERIA, 20 JULY 1998 (CHG. 28-30 JULY 2004)
2. AMERICAN SOCIETY OF HEATING, REFRIGERATION, AND AIR CONDITIONING ENGINEERS (ASHRAE) MANUALS
3. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA), NATIONAL FIRE CODES (NFC)
4. ENGINEERING TECHNICAL LETTER (ETL) 1110-3-491 - SUSTAINABLE DESIGN AND DEVELOPMENT FOR MILITARY FACILITIES, 1 MAY 2001
5. UFC 3-410-01 LATEST EDITION: HEATING, VENTILATING AND AIR CONDITIONING (WITH CHANGE 9)
6. UFC 3-410-02 LATEST EDITION DESIGN: LONWORKS(R) DIRECT DIGITAL CONTROL FOR HVAC AND OTHER BUILDING SYSTEMS

PLUMBING DESIGN REQUIREMENTS

1. NATIONAL STANDARD PLUMBING CODE (NAPHCC) AND ASHRAE TECHNICAL MANUALS

CIVIL ENGINEERING

1. UNIFIED FACILITIES CRITERIA (UFC) 3-201-01 CIVIL ENGINEERING, LATEST EDITION
2. UNIFIED FACILITIES CRITERIA (UFC) 3-250-01 PAVEMENT DESIGN FOR ROADS AND PARKING AREAS, LATEST EDITION

ARCHITECTURAL

1. ABA - ARCHITECTURAL BARRIERS ACT
2. IDG- INSTALLATION DESIGN GUIDES
3. NFPA 80, STANDARD FOR FIRE DOORS AND OTHER OPENING PROTECTIVES
4. UNIFIED FACILITIES CRITERIA (UFC) 1-200-02, HIGH PERFORMANCE AND SUSTAINABLE BUILDING REQUIREMENTS
5. UNIFIED FACILITIES CRITERIA (UFC) 3-101-01, ARCHITECTURE
6. UNIFIED FACILITIES CRITERIA (UFC) 3-110-03, ROOFING
7. UNIFIED FACILITIES CRITERIA (UFC) 3-600-01, FIRE PROTECTION ENGINEERING FOR FACILITIES
8. UNIFIED FACILITIES CRITERIA (UFC) 4-023-07, DESIGN TO RESIST DIRECT FIRE WEAPONS EFFECTS

STRUCTURAL

1. FOR A STRUCTURAL REFERENCE, AND AS A GENERAL REFERENCE USE UFC 1-200-01 "DESIGN:GENERAL BUILDING REQUIREMENTS" LATEST EDITION
2. TI 809-04, TECHNICAL INSTRUCTIONS - SEISMIC DESIGN FOR BUILDINGS, 13 DECEMBER 1998 (UFC 3-310-04)
3. TI 809-04, TECHNICAL INSTRUCTIONS - STRUCTURAL DESIGN CRITERIA FOR BUILDINGS, 01 SEPTEMBER 1999 (UFC 3-310-04)

GENERAL NOTE

1. PLEASE NOTE THAT THE PRESENTED ACP LAYOUTS ARE ILLUSTRATIVE EXAMPLES AND DO NOT REPRESENT A RIGID SET OF REQUIREMENTS. THESE LAYOUTS ARE INTENDED TO PROVIDE GUIDANCE, AND ADAPTATION MAY BE NECESSARY BASED ON SPECIFIC SITE CONDITIONS. SHOULD SPACE CONSTRAINTS ARISE, COMPONENTS MAY BE ADJUSTED AND REPOSITIONED TO OPTIMIZE FUNCTIONALITY AND CLARITY. PRIORITIZATION OF ESSENTIAL ELEMENTS IS ENCOURAGED WHEN MODIFICATIONS ARE MADE. REFER TO SDDCTEA PAMPHLET 55-15, FOR COMPREHENSIVE DETAILS AND APPROVED GUIDELINES. ITS OS HIGHLY RECOMMENDED THAT THE CENTER OF STANDARDIZATION (COS) FOR ACCESS CONTROL POINTS (ACP) BE CONTACTED AT THE BEGINNING OF THE PLANNING PROCESS FOR A PROJECT THAT WILL DESIGN A NEW OR SUBSTANTIALLY ALTERED ACP. PLEASE SEE http://mrsi.erdc.dren.mil/cos/nwo/acp/FOR CONTACT INFORMATION.

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FILENAME: COS-ACP-C-001.DWG

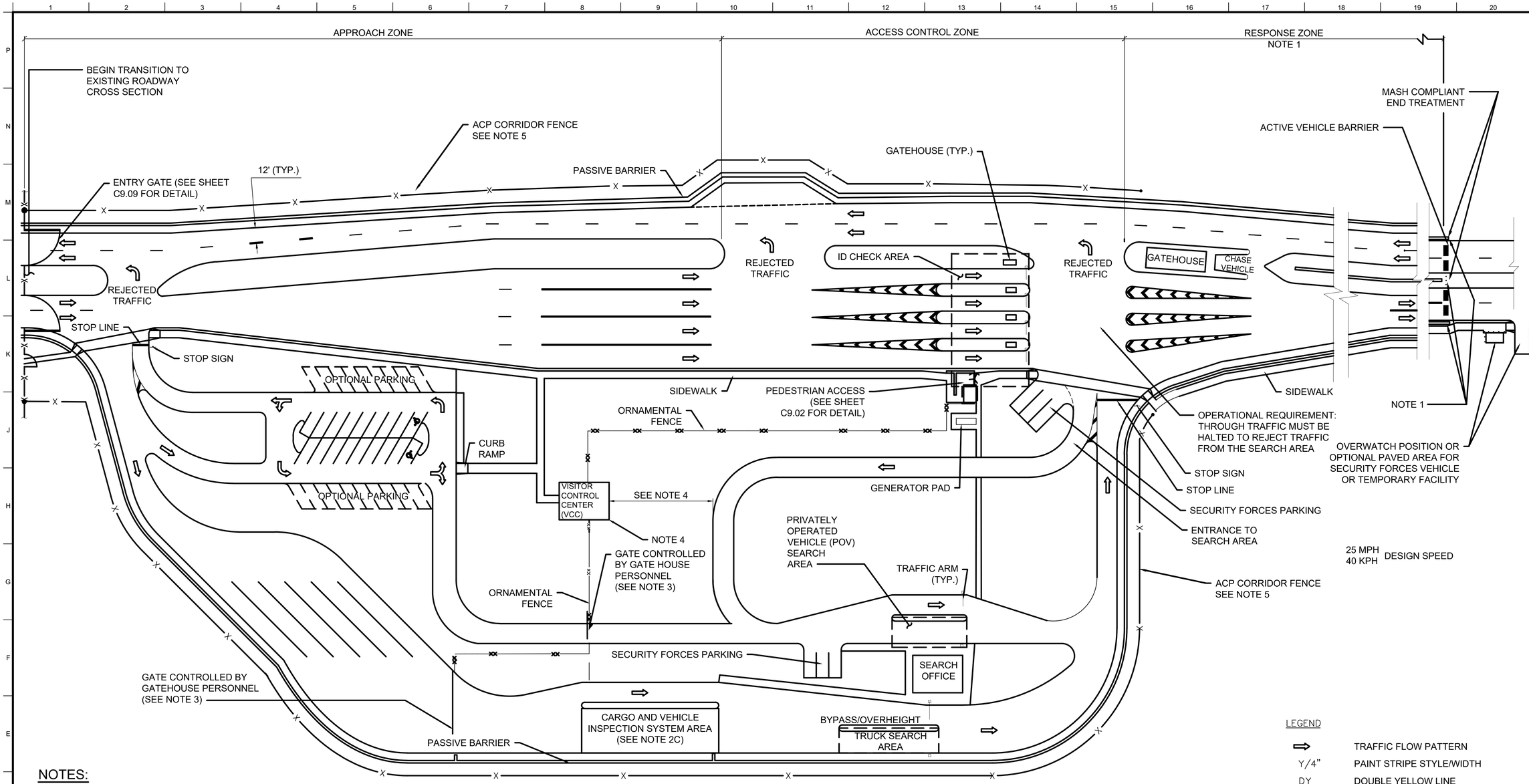
U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE
OMAHA, NE 68102

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

GENERAL NOTES

SHEET ID

C-001



D11 EXAMPLE: PRIMARY ACP WITH VCC AND COMMERIAL VEHICLE
SCALE: NTS

NOTES:

1. SEE 'ARMY ACCESS CONTROL POINT - STANDARD DESIGN' FOR METHOD TO DETERMINE DETECTION AND DELAY REQUIREMENTS INCLUDING THE LENGTH OF THE RESPONSE ZONE. SEE DWGS. C9.01 AND C9.02 FOR DETAILS OF THE PASSIVE AND ACTIVE VEHICLE BARRIER INTERFACES. SEE SDDCTEA PAMPHLET 55-15 FOR DETAILED LAYOUTS OF THE SIGNS, SIGNALS, AND STRIPING REQUIRED FOR EACH OF THE CURRENTLY ACCEPTED ACTIVE VEHICLE BARRIER SAFETY SCHEMES. SEE DWG.C9.04 FOR PAVEMENT MARKING DETAIL.
2. OPTIONAL: PROVIDE A 35' WIDE X 110' LONG PAVED INSPECTION AREA FOR USE BY THE CARGO AND VEHICLE INSPECTION SYSTEM. THIS PROVIDES ENOUGH WIDTH FOR THE INSPECTION SYSTEM AND THE LANE OF TRAVEL FOR THE VEHICLES TO BE INSPECTED. THE LENGTH IS SUFFICIENT TO ALLOW THE INSPECTION SYSTEM TO SCAN A LARGE STATIONARY VEHICLE AND MANEUVER.

A. TO INCREASE THROUGHPUT A LONGER INSPECTION LANE CAN BE PROVIDED FOR OPERATION OF THE CARGO AND VEHICLE INSPECTION SYSTEM THAT SCANS STATIONARY VEHICLES.THIS WILL ALLOW THE SYSTEM TO SCAN SEVERAL VEHICLES AT ONE TIME.

B. PROVIDE NO CANOPY OVER THE INSPECTION AREA PLANNED OR DEDICATED FOR USE BY THE CARGO AND VEHICLE INSPECTION SYSTEM UNLESS THE CLEAR HEIGHT IS A MINIMUM OF 22'.

C. RADIATION EXCLUSION ZONES WILL BE CONSIDERED FOR ALL SCANNING EQUIPMENT.

D. ADD CONDUIT FOR ELECTRICAL POWER AND PROVIDE SUFFICIENT ELECTRICAL POWER CAPACITY FOR POSSIBLE ADDITION OF A FIXED VEHICLE INSPECTION SYSTEM.

3. SLIDING GATES TO CLOSE SEARCH AREA DURING NON-MANNED HOURS.
4. IF BETWEEN 11 & 50 PEOPLE INHABIT THE VCC ON A ROUTINE BASIS, THEN THE VCC IS AN INHABITED BUILDING OUTSIDE A CONTROLLED PERIMETER. PER DOD MINIMUM ANTI-TERRORISM STANDARDS FOR BUILDINGS (UFC 4-010-01), REQUIRED STANDOFF DISTANCES FROM ROADS AND PARKING AREAS ARE DETERMINED BY SITE-SPECIFIC BUILDING REQUIREMENTS AND RISK ASSESSMENTS.
6. THE ACP CORRIDOR FENCE MAY BE INCORPORATED INTO CERTAIN TYPES OF PASSIVE BARRIERS. IF FENCE IS NOT INCORPORATED INTO THE PASSIVE BARRIER, LOCATE FENCE A SUFFICIENT DISTANCE FROM THE PASSIVE BARRIER SUCH THAT THE AREA BETWEEN THE PASSIVE BARRIER AND FENCE CAN BE MAINTAINED AND THE PASSIVE BARRIER CANNOT BE USED TO AIDE A FENCE CLIMBER. THE AREA BETWEEN FENCE AND PASSIVE BARRIER IS A CLEAR ZONE AND MUST BE FREE OF OBSTRUCTIONS AND PLANTINGS OVER 4 INCHES TALL. FENCE SHALL BE A MINIMUM OF 6'-0" TALL CHAIN LINK FENCE WITH SINGLE OUTRIGGER AND 3 STRAND BARBED WIRE (FE6-72).

1. SEE GENERAL NOTE ON SHEET C-001.

LEGEND

⇨	TRAFFIC FLOW PATTERN
Y/4"	PAINT STRIPE STYLE/WIDTH
DY	DOUBLE YELLOW LINE
SW	SOLID WHITE LINE
	TRAFFIC ARM
	ACTIVE VEHICLE BARRIER
	PASSIVE VEHICLE BARRIER
	ORNAMENTAL FENCE
	FENCE
	BOLLARDS
	CANOPY
	BARRIER WALL
	DOUBLE FACE GUARD RAIL
	SINGLE FACE GUARD RAIL
	GUARD BOOTH
	GENERATOR PAD W/SIDEWALK
	CURB RAMP

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U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE
OMAHA, NE 68102

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

SITE PLAN
PRIMARY ACP WITH VCC AND COMMERCIAL VEHICLE ACCESS

SHEET ID
C-301

APPROACH ZONE

ACCESS CONTROL ZONE

RESPONSE ZONE
NOTE 1

ENTRY GATE
(SEE SHEET C909
FOR DETAIL)

PASSIVE BARRIER

ID CHECK
AREA

GATEHOUSE

ACP CORRIDOR FENCE
SEE NOTE 5 ON DWG C301

BEGIN TAPER TO EXISTING
ROADWAY CROSS SECTION

SHOULDER

ACTIVE VEHICLE BARRIER

MASH COMPLIANT
END TREATMENT

BEGIN
TRANSITION
TO EXISTING
ROADWAY
CROSS
SECTION

REJECTED
TRAFFIC
FROM VCC

REJECTED
TRAFFIC

REJECTED
TRAFFIC

CHASE
VEHICLE

TRAFFIC ARE
(TYP.)

STOP
LINE

STOP
LINE

STOP SIGN

SIDEWALK

PEDESTRIAN ACCESS (SEE
SHEET C902 FOR DETAIL)

GENERATOR PAD

SIDEWALK

SW

DY

OPERATIONAL REQUIREMENT:
THROUGH TRAFFIC MUST BE
HALTED TO REJECT TRAFFIC
FROM THE SEARCH AREA

SIDEWALK

NOTE 1
OVERWATCH POSITION OR
OPTIONAL PAVED AREA FOR
SECURITY FORCES VEHICLE
OR TEMPORARY FACILITY

DY

STOP SIGN

ORNAMENTAL
FENCE

PASSENGER VEHICLE
SEARCH AREA

OPTIONAL PARKING

HANDICAP
RAMP

VISITOR
CONTROL
CENTER
(VCC)

ENTRANCE TO
SEARCH AREA

ACP CORRIDOR FENCE
SEE NOTE 5 ON DWG C301

SEARCH
OFFICE

NOTE 3

PASSENGER VEHICLE
SEARCH AREA

OPTIONAL PARKING

GATE CONTROLLED BY
GATE HOUSE PERSONNEL
(SEE NOTE 2)

PASSIVE BARRIER

40 KPH
25 MPH DESIGN SPEED

LEGEND

⇨	TRAFFIC FLOW PATTERN
Y/4"	PAINT STRIPE STYLE/WIDTH
DY	DOUBLE YELLOW LINE
SW	SOLID WHITE LINE
	TRAFFIC ARM
	ACTIVE VEHICLE BARRIER
	PASSIVE VEHICLE BARRIER
	ORNAMENTAL FENCE
	FENCE
	BOLLARDS
	CANOPY
	BARRIER WALL
	DOUBLE FACE GUARD RAIL
	SINGLE FACE GUARD RAIL
	GUARD BOOTH
	GENERATOR PAD W/SIDEWALK
	CURB RAMP

NOTES:

1. SEE 'ARMY ACCESS CONTROL POINT - STANDARD DESIGN' FOR METHOD TO DETERMINE DETECTION AND DELAY REQUIREMENTS INCLUDING THE LENGTH OF THE RESPONSE ZONE. SEE DWGS. C9.01 AND C9.02 FOR DETAILS OF THE PASSIVE AND ACTIVE VEHICLE BARRIER INTERFACES. SEE SDDCTEA PAMPHLET 55-15 FOR DETAILED LAYOUTS OF THE SIGNS, SIGNALS, AND STRIPING REQUIRED FOR EACH OF THE CURRENTLY ACCEPTED ACTIVE VEHICLE BARRIER SAFETY SCHEMES. SEE DWG.C9.04 FOR PAVEMENT MARKING DETAIL.
2. SLIDING GATE TO CLOSE SEARCH AREA DURING NON-MANNED HOURS.
3. IF BETWEEN 11 & 50 PEOPLE INHABIT THE VCC ON A ROUTINE BASIS, THEN THE VCC IS AN INHABITED BUILDING WITHIN AN UNCONTROLLED PERIMETER. PER DOD MINIMUM ANTI-TERRORISM STANDARDS FOR BUILDINGS (UFC 4-010-01), REQUIRED STANDOFF DISTANCES FROM ROADS AND PARKING AREAS ARE DETERMINED BY SITE-SPECIFIC BUILDING REQUIREMENTS AND RISK ASSESSMENTS.

C7 EXAMPLE - PRIMARY/SECONDARY ACP WITH VCC (NOT FOR COMMERCIAL VEHICLES)
SCALE: NTS

1. SEE GENERAL NOTE ON SHEET C-001.

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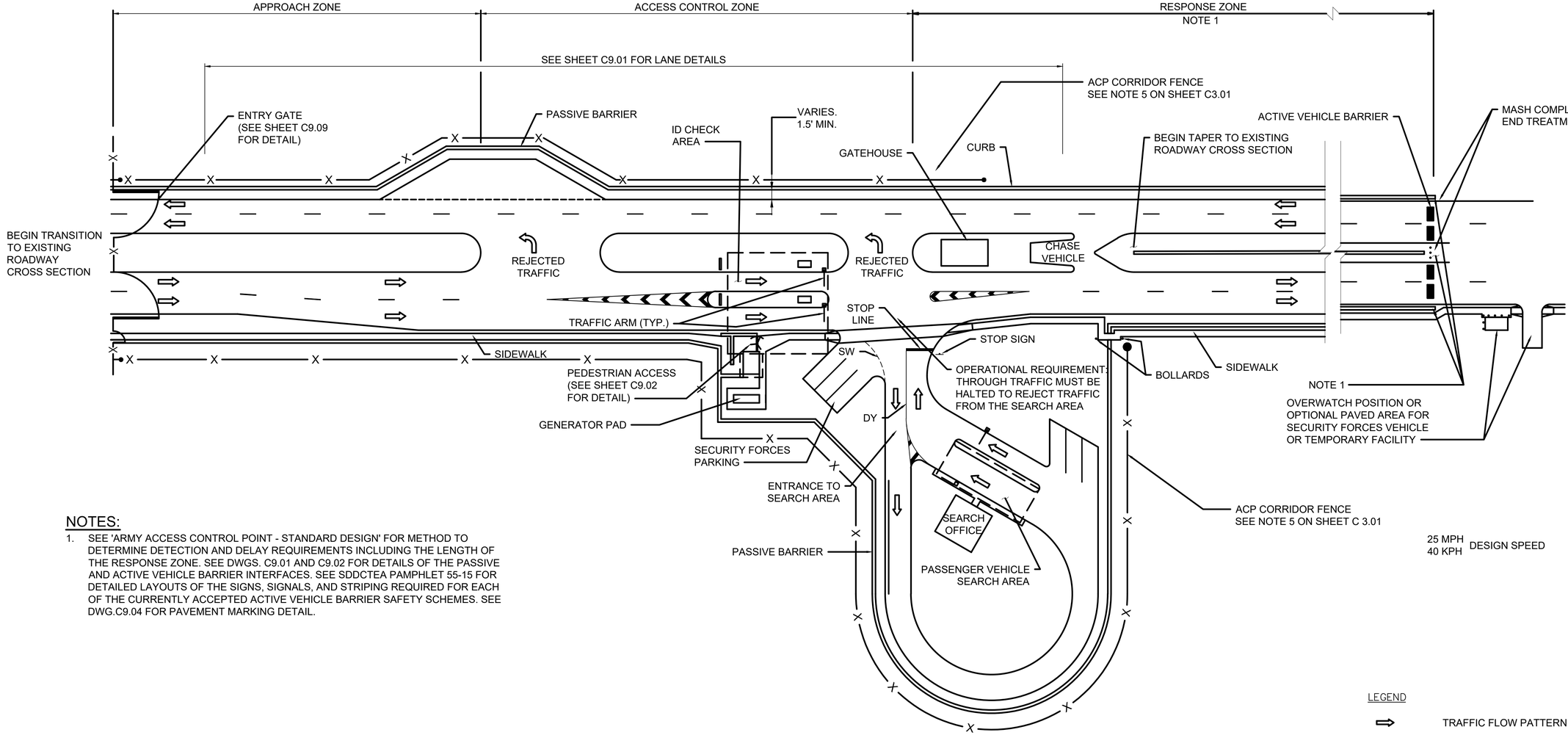
OMAHA DISTRICT
1616 CAPITOL AVE
OMAHA, NE 68102

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

SITE PLAN
PRIMARY/SECONDARY ACP WITH VCC

SHEET ID
C-302



NOTES:

1. SEE 'ARMY ACCESS CONTROL POINT - STANDARD DESIGN' FOR METHOD TO DETERMINE DETECTION AND DELAY REQUIREMENTS INCLUDING THE LENGTH OF THE RESPONSE ZONE. SEE DWGS. C9.01 AND C9.02 FOR DETAILS OF THE PASSIVE AND ACTIVE VEHICLE BARRIER INTERFACES. SEE SDDCTEA PAMPHLET 55-15 FOR DETAILED LAYOUTS OF THE SIGNS, SIGNALS, AND STRIPING REQUIRED FOR EACH OF THE CURRENTLY ACCEPTED ACTIVE VEHICLE BARRIER SAFETY SCHEMES. SEE DWG.C9.04 FOR PAVEMENT MARKING DETAIL.

D7 EXAMPLE: PRIMARY/SECONDARY ACP WITHOUT VCC (COMMERCIAL VEHICLE PROHIBITED)
SCALE: NTS

LEGEND

- TRAFFIC FLOW PATTERN
- Y/4" PAINT STRIPE STYLE/WIDTH
- DY DOUBLE YELLOW LINE
- SW SOLID WHITE LINE
- TRAFFIC ARM
- ACTIVE VEHICLE BARRIER
- PASSIVE VEHICLE BARRIER
- ORNAMENTAL FENCE
- FENCE
- BOLLARDS
- CANOPY
- BARRIER WALL
- DOUBLE FACE GUARD RAIL
- SINGLE FACE GUARD RAIL
- GUARD BOOTH
- GENERATOR PAD W/SIDEWALK
- CURB RAMP

1. SEE GENERAL NOTE ON SHEET C-001.

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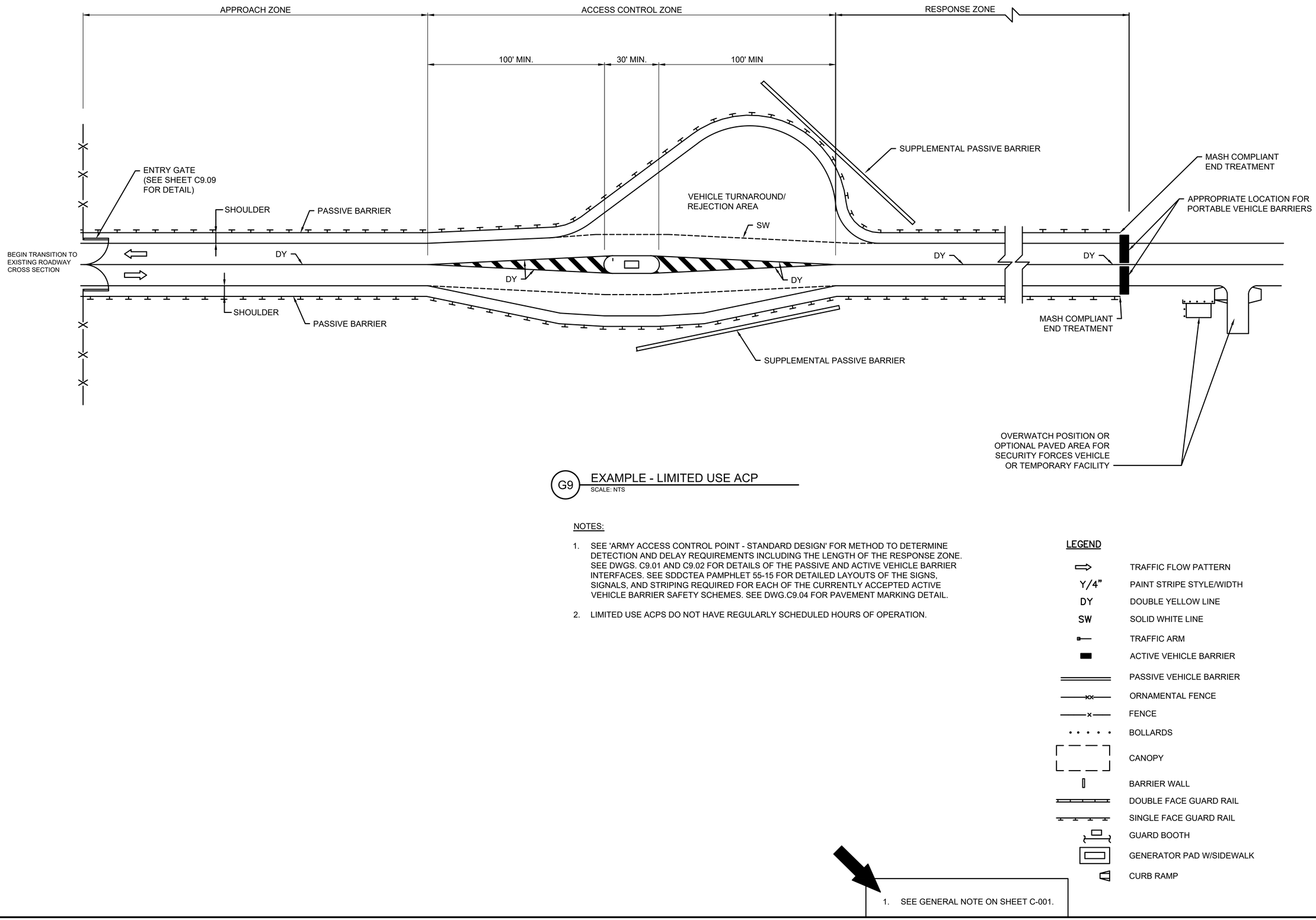
OMAHA DISTRICT
1616 CAPITOL AVE
OMAHA, NE 68102

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

SITE PLAN
PRIMARY/SECONDARY ACP WITHOUT VCC

SHEET ID
C-303



G9 EXAMPLE - LIMITED USE ACP

SCALE: NTS

NOTES:

1. SEE 'ARMY ACCESS CONTROL POINT - STANDARD DESIGN' FOR METHOD TO DETERMINE DETECTION AND DELAY REQUIREMENTS INCLUDING THE LENGTH OF THE RESPONSE ZONE. SEE DWGS. C9.01 AND C9.02 FOR DETAILS OF THE PASSIVE AND ACTIVE VEHICLE BARRIER INTERFACES. SEE SDDCTEA PAMPHLET 55-15 FOR DETAILED LAYOUTS OF THE SIGNS, SIGNALS, AND STRIPING REQUIRED FOR EACH OF THE CURRENTLY ACCEPTED ACTIVE VEHICLE BARRIER SAFETY SCHEMES. SEE DWG.C9.04 FOR PAVEMENT MARKING DETAIL.
2. LIMITED USE ACPS DO NOT HAVE REGULARLY SCHEDULED HOURS OF OPERATION.

LEGEND

⇨	TRAFFIC FLOW PATTERN
Y/4"	PAINT STRIPE STYLE/WIDTH
DY	DOUBLE YELLOW LINE
SW	SOLID WHITE LINE
	TRAFFIC ARM
	ACTIVE VEHICLE BARRIER
	PASSIVE VEHICLE BARRIER
	ORNAMENTAL FENCE
	FENCE
	BOLLARDS
	CANOPY
	BARRIER WALL
	DOUBLE FACE GUARD RAIL
	SINGLE FACE GUARD RAIL
	GUARD BOOTH
	GENERATOR PAD W/SIDEWALK
	CURB RAMP

1. SEE GENERAL NOTE ON SHEET C-001.

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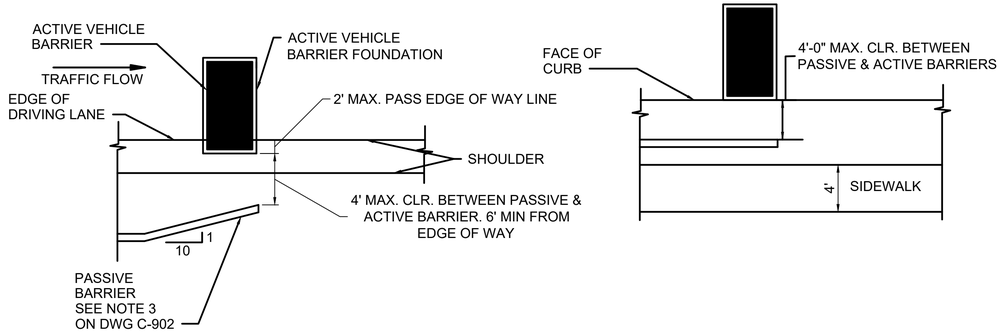
U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE
OMAHA, NE 68102

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

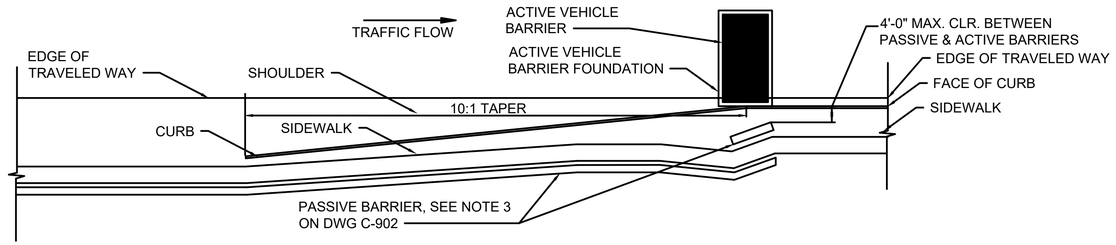
SITE PLAN
LIMITED USE ACP

SHEET ID

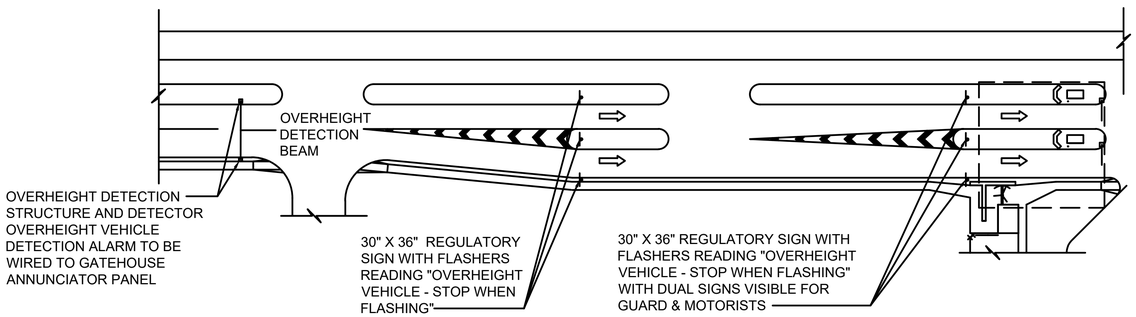
C-304



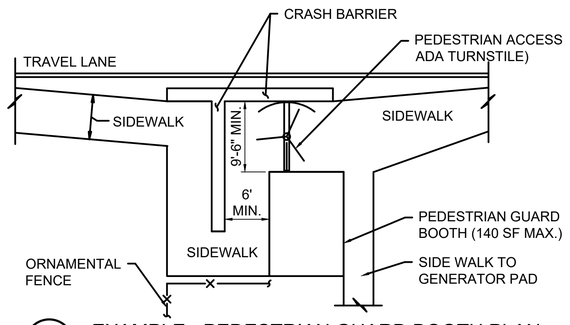
K3 EXAMPLE - ACTIVE VEHICLE BARRIER/PASSIVE BARRIER PLANS
SCALE: NTS



F2 EXAMPLE - ACTIVE VEHICLE BARRIER IN A SHOULDER TO CURB TRANSITION (WITH SIDEWALK)
SCALE: NTS



A5 EXAMPLE - OPTIONAL OVERHEIGHT DETECTION
SCALE: NTS



B14 EXAMPLE - PEDESTRIAN GUARD BOOTH PLAN
SCALE: NTS

PEDESTRIAN GUARD BOOTH NOTES:
1. PEDESTRIAN CAPACITY TO BE DETERMINED BY TRAFFICENGINEERING STUDY
2. FINAL CONFIGURATION OF EQUIPMENT & BUILDINGS SHALL BE DEPENDENT UPON INSTALLATIONS REQUIREMENTS AND OPERATING PROCEDURES.

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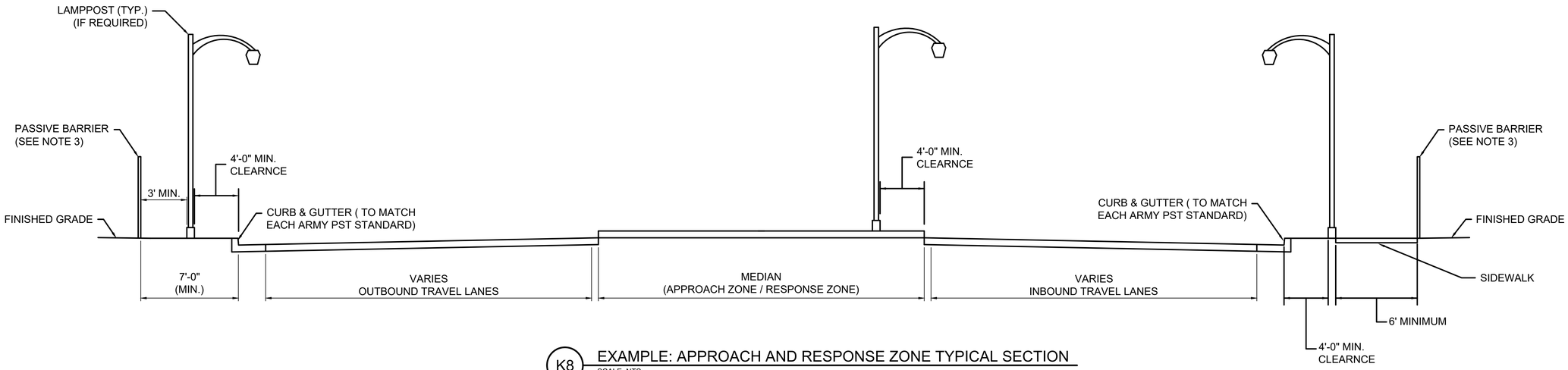
OMAHA, NE 68102

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

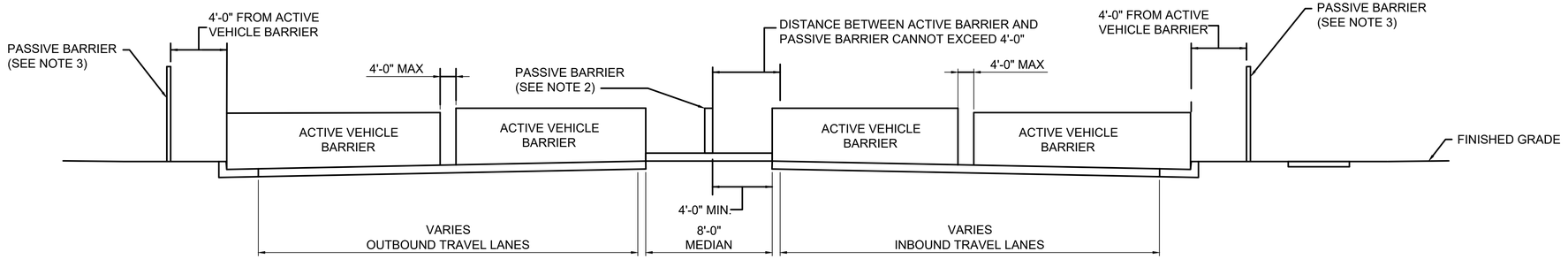
SITE PLAN
ACP DETAILS

SHEET ID
C-901



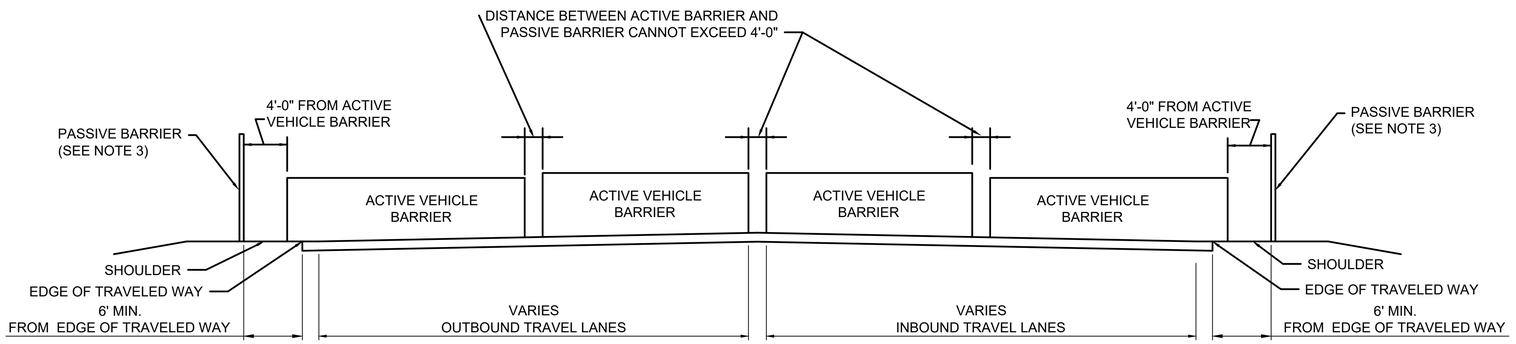
K8 EXAMPLE: APPROACH AND RESPONSE ZONE TYPICAL SECTION

SCALE: NTS



E8 EXAMPLE: ACTIVE VEHICLE BARRIER TYPICAL SECTION

SCALE: NTS



A2 EXAMPLE - ACTIVE VEHICLE BARRIER TYPICAL SECTION SHOULDERED ROADWAY W/O MEDIAN

SCALE: NTS

NOTES:

1. PROVIDE 5' BIKEWAY IF APPROPRIATE.
2. NUMBER OF PASSIVE BARRIERS IS DETERMINED BY WIDTH OF MEDIAN AND DISTANCE BETWEEN PASSIVE BARRIES NOT EXCEEDING 4'-0".
3. TYPE AND SIZE OF PASSIVE BARRIERS TO BE DETERMINED IN FINAL DESIGN. PASSIVE BARRIERS MUST PROVIDE VEHICLE PENETRATION RESISTANCE. PASSIVE BARRIERS IN THE CLEAR ZONE MUST BE OF THE TYPE THAT REDIRECT VEHICLES BACK ON THE ROADWAY FOR A SIDE SWIPE IMPACT. SEE ASSHTO ROADSIDE DESIGN GUIDE.

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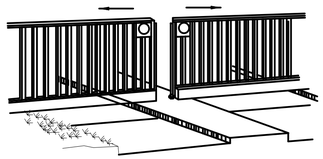
OMAHA, NE 68102

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

SITE PLAN
TYPICAL SECTIONS

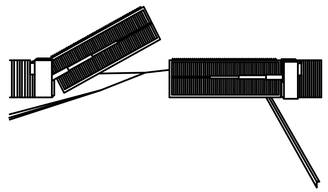
SHEET ID

C-902



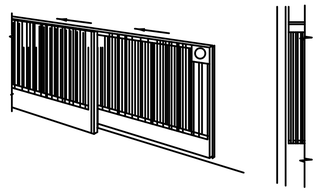
OPERATION: GATE SLIDES HORIZONTALLY, MANUALLY OR MOTOR OPERATED

M1 EXAMPLE - SLIDING GATE
SCALE: NTS



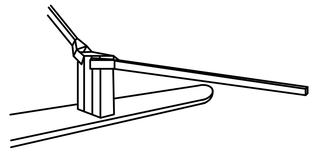
OPERATION: ARM AND GATE OPEN VERTICALLY MOTORIZED

M6 EXAMPLE - VERTICAL PIVOT GATE
SCALE: NTS



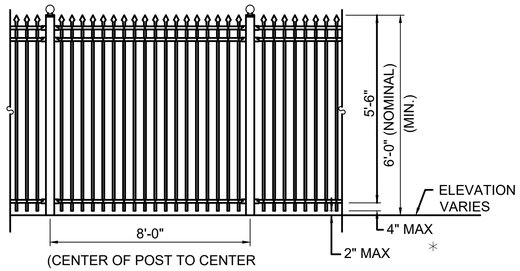
OPERATION: MULTIPLE SECTIONS MOVE HORIZONTALLY, MANUALLY OR MOTOR OPERATED.

L11 EXAMPLE - TELESCOPING GATE
SCALE: NTS



OPERATION: ARM RAISED TO ALLOW TRAFFIC TO PASS.

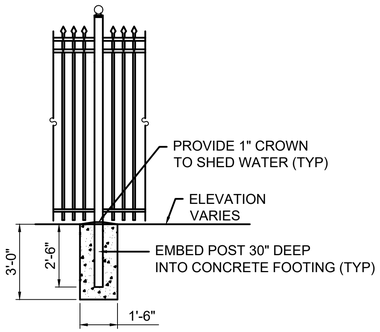
L16 EXAMPLE - TRAFFIC ARM
SCALE: NTS



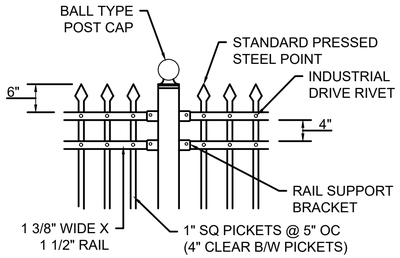
(CENTER OF POST TO CENTER OF POST) MAX SPACING FOR FENCING. SPACING MAY VARY FOR SECTIONS AT TURNING OR TERMINATION POINTS IN FENCE LAYOUT.

G1 EXAMPLE - FENCING ELEVATION DETAIL
SCALE: NTS

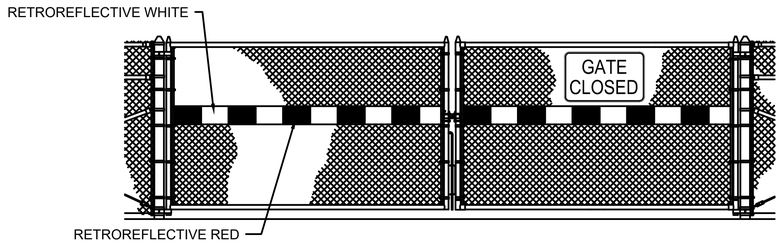
* CLEARANCE BETWEEN FENCE AND GROUND SHALL BE BETWEEN 2" MIN AND 4" MAX.



G6 EXAMPLE - FENCE POST DETAIL
SCALE: NTS



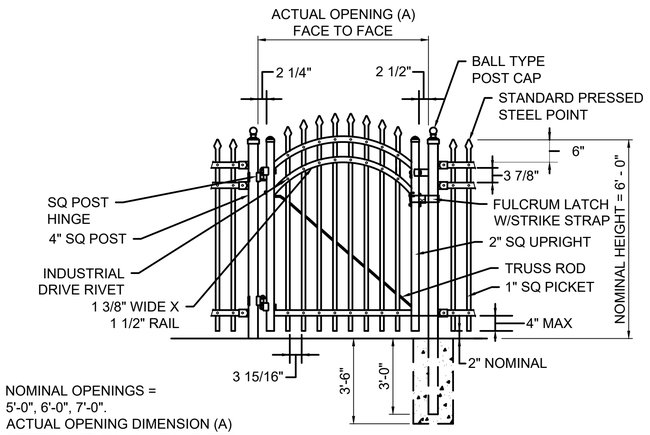
G10 EXAMPLE - RAIL/POST DETAIL
SCALE: NTS



TYPE III BARRICADE NOTES:

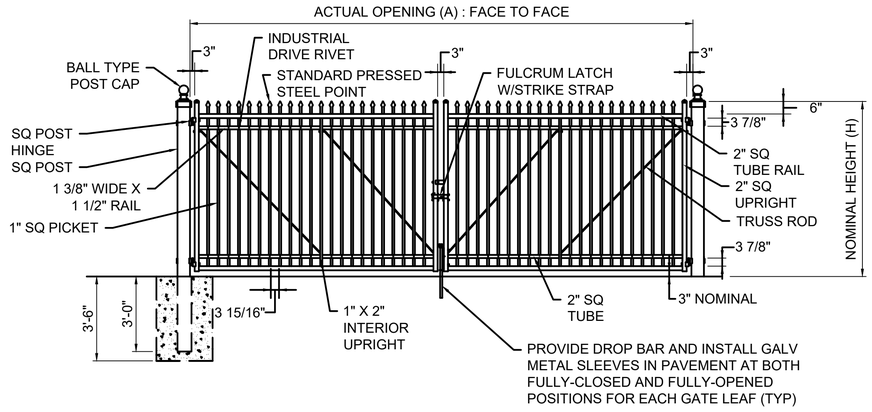
1. SIGNAGE POSTED AT GATES ARE R11-2 "GATE CLOSED" SIGN SIZED TO 48X30 AND SHALL BE INSTALLED ON BOTH SIDES OF GATE LEAFS
2. ALTERNATING RED AND WHITE RETROREFLECTIVE SIGN PANELS SHALL BE INSTALLED ON BOTH SIDES OF GATE LEAF.
3. A "GATE CLOSED" SIGN LISTING THE HOURS OF OPERATION SHOULD BE INSTALLED PRIOR TO THE BARRICADE, AND AT THE BARRICADE AS WELL.
4. FOR ACPS THAT HAVE FIXED HOURS AND ARE MORE THAN ONE MILE AWAY FROM THE PRIMARY ROADWAY, INSTALL SIGNS SHOWING THE HOURS OF ACP OPERATION IN ADVANCE OF THE ACP.

F15 SIGNAGE DETAIL FOR ENTRY GATE
SCALE: NTS



NOMINAL OPENINGS = 5'-0", 6'-0", 7'-0".
ACTUAL OPENING DIMENSION (A) DETERMINED BY MANUFACTURER.

A2 EXAMPLE - PERSONNEL SWING GATE DETAIL
SCALE: NTS



A9 EXAMPLE - ORNAMENTAL METAL FENCE DOUBLE SWING GATE ELEVATION DETAIL
SCALE: NTS

NOTE: ITEMS SHOWN ON THIS PAGE ARE NOT VEHICLE IMPACT RESISTANT

STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGEMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

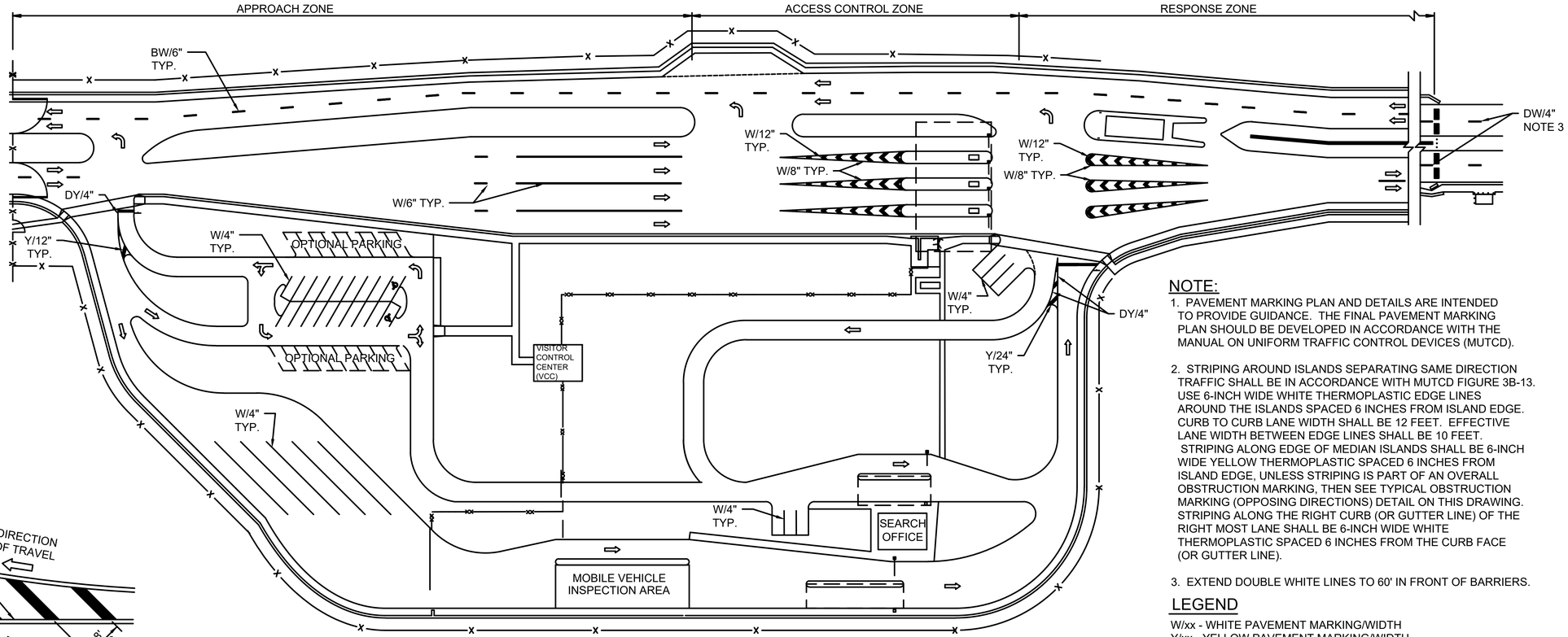
DESIGNED BY:
DRAWN BY:
CHECKED BY:
SUBMITTED BY:
SIZE: ANSI D
ISSUE DATE: AUGUST 2025
SOLICITATION NO.:
CONTRACT NO.:
FILE NUMBER:
FILENAME: COS-ACP-C-903.DWG

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE
OMAHA, NE 68102

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

SITE PLAN
GATES AND FENCES

SHEET ID
C-903



NOTE:

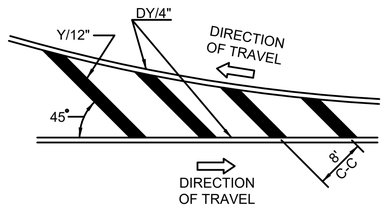
1. PAVEMENT MARKING PLAN AND DETAILS ARE INTENDED TO PROVIDE GUIDANCE. THE FINAL PAVEMENT MARKING PLAN SHOULD BE DEVELOPED IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).

2. STRIPING AROUND ISLANDS SEPARATING SAME DIRECTION TRAFFIC SHALL BE IN ACCORDANCE WITH MUTCD FIGURE 3B-13. USE 6-INCH WIDE WHITE THERMOPLASTIC EDGE LINES AROUND THE ISLANDS SPACED 6 INCHES FROM ISLAND EDGE. CURB TO CURB LANE WIDTH SHALL BE 12 FEET. EFFECTIVE LANE WIDTH BETWEEN EDGE LINES SHALL BE 10 FEET. STRIPING ALONG EDGE OF MEDIAN ISLANDS SHALL BE 6-INCH WIDE YELLOW THERMOPLASTIC SPACED 6 INCHES FROM ISLAND EDGE, UNLESS STRIPING IS PART OF AN OVERALL OBSTRUCTION MARKING, THEN SEE TYPICAL OBSTRUCTION MARKING (OPPOSING DIRECTIONS) DETAIL ON THIS DRAWING. STRIPING ALONG THE RIGHT CURB (OR GUTTER LINE) OF THE RIGHT MOST LANE SHALL BE 6-INCH WIDE WHITE THERMOPLASTIC SPACED 6 INCHES FROM THE CURB FACE (OR GUTTER LINE).

3. EXTEND DOUBLE WHITE LINES TO 60' IN FRONT OF BARRIERS.

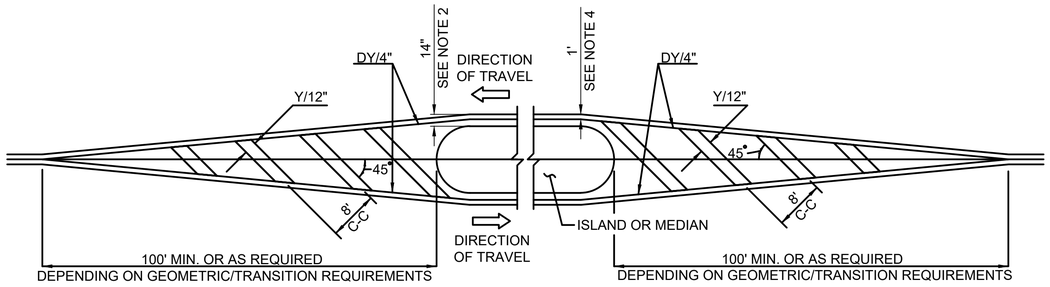
LEGEND

W/xx - WHITE PAVEMENT MARKING/WIDTH
Y/xx - YELLOW PAVEMENT MARKING/WIDTH
BW/xx - BROKEN WHITE PAVEMENT MARKING/WIDTH
DY/xx - DOUBLE YELLOW PAVEMENT MARKING/WIDTH

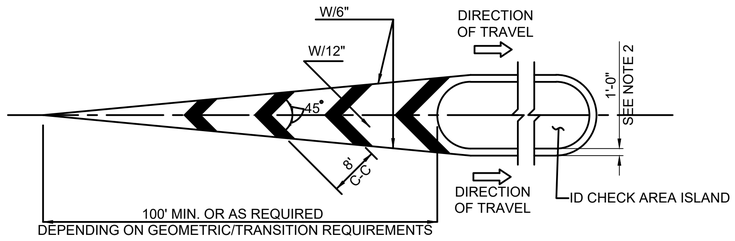


F1 45° GORE HATCHING
SCALE: NTS

F7 TYPICAL ACP PAVEMENT MARKINGS
SCALE: NTS

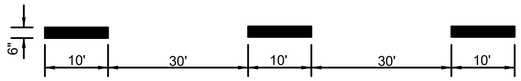


C2 TYPICAL OBSTRUCTION MARKINGS (OPPOSING DIRECTIONS)
SCALE: NTS



C13 TYPICAL OBSTRUCTION MARKINGS (SAME DIRECTION)
SCALE: NTS

A2 100MM (4") DOUBLE YELLOW/WHITE LINE
SCALE: NTS



A7 6" BROKEN LANE LINE
SCALE: NTS

A13 6" DASHED LINE
SCALE: NTS

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
SUBMITTED BY:
SIZE: ANSI D
ISSUE DATE: AUGUST 2025
SOLICITATION NO.:
CONTRACT NO.:
FILE NUMBER:
FILENAME: COS-ACP-C-904.DWG

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE
OMAHA, NE 68102

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

SITE PLAN
PAVEMENT MARKING DETAILS

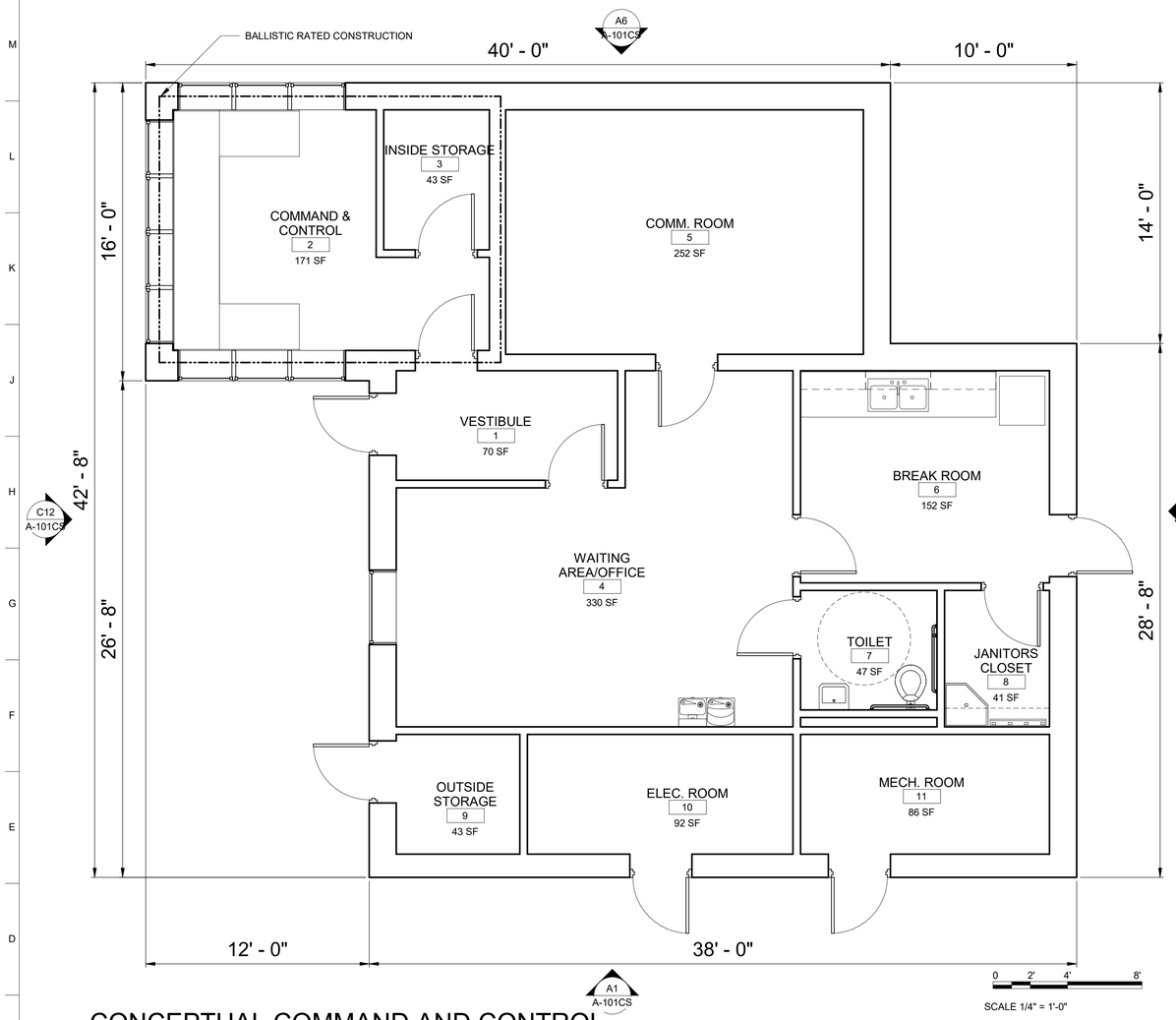
SHEET ID
C-904

GENERAL NOTES:
1. THIS CONCEPTUAL FLOOR PLAN REPRESENTS A FUNCTIONAL ARRANGEMENT, BUT IS NOT A REQUIRED LAYOUT.
2. ALL WALLS CAN BE ADJUSTED TO MEET THE NEEDS OF THE SPECIFIC INSTALLATION AND TO COMPLY WITH THE INSTALLATION FACILITY STANDARDS.
3. DIFFERENT ROOF DESIGNS ARE ALLOWED, COMPLY WITH UFC 3-110-03. LOW SLOPE ROOFING IS ACCEPTABLE, IF APPROVED BY THE INSTALLATION FACILITY STANDARDS.
4. OTHER FUNCTIONS CAN BE COMBINED INTO ONE BUILDING. THIS IS ONE EXAMPLE ON HOW TO COMBINE MORE THAN ONE FUNCTION INTO ONE BUILDING.

FUNCTIONAL AREAS (WITH AREA SQUARE FOOTAGE (SF) AND NOTES):
1. VESTIBULE (NOT LESS THAN 50 SF)
2. COMMAND & CONTROL (REQUIRES BALLISTIC RATED CONSTRUCTION UL 752 LEVEL 3 AT MINIMUM. NO LESS THAN 150 SF.)
3. INSIDE/OUTSIDE STORAGE (SF IS BASED ON USER REQUIREMENTS)
4. WAITING AREA/OFFICE (NO LESS THAN 300 SF)
5. COMM ROOM (SEE UFC 3-580-01 FOR SF REQUIREMENTS. IN ADDITION, SIZE ACCORDING TO USER AND EQUIPMENT NEEDS.)
6. BREAK ROOM (NO LESS THAN 150 SF)
7. TOILET (NO LESS THAN 48 SF EACH, COMPLY WITH ARCHITECTURAL BARRIERS ACT.)
8. JANITOR'S CLOSET (SF IS BASED ON USER NEEDS)
9. MECHANICAL/ELECTRICAL ROOM (SF IS BASED ON USER/BUILDING REQUIREMENTS)
10. SEE ARMY STANDARD DESIGN FOR NURSING MOTHER'S ROOM REQUIREMENTS.

BUILDING/SITE FUNCTIONS:	THIS CONCEPT PROVIDES THE FUNCTIONS:
VISITOR CONTROL CENTER (VCC)	
GUARD BOOTHS	
SEARCH BUILDING AREA	■
COMMAND AND CONTROL	■
ID CHECK AREA	
SEARCH AREA	
OVERWATCH	
TOILET	■
COMMUNICATIONS	■
MECHANICAL/ELECTRICAL	■
STORAGE	■

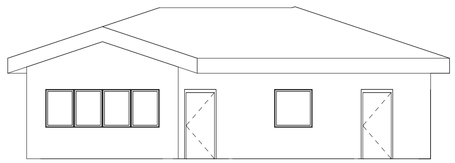
BUILDING/SITE FUNCTION NOTES:
1. COMBINING FUNCTIONS/BUILDINGS IS ACCEPTABLE.
2. SEE ACP STANDARD DESIGN 1.4.1/1.4.2 FOR ADDITIONAL INFORMATION.



SCALE 1/4" = 1'-0"

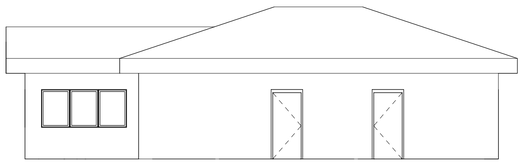
C1 CONCEPTUAL COMMAND AND CONTROL W/ SEARCH AREA BUILDING

1/4" = 1'-0" BUILDING GROSS SQUARE FOOTAGE: 1674 SF



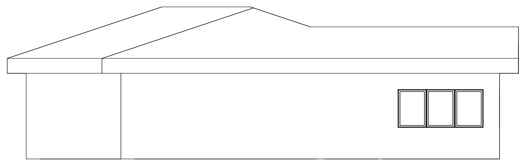
C12 WEST ELEVATION

1/8" = 1'-0"



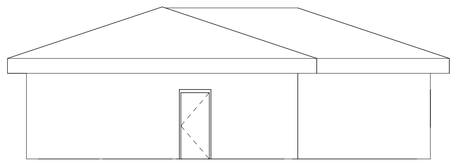
A1 SOUTH ELEVATION

1/8" = 1'-0"



A6 NORTH ELEVATION

1/8" = 1'-0"



A12 EAST ELEVATION

1/8" = 1'-0"

PLAN NORTH
WILL VARY BASED ON SITE

0 4' 8' 16'

SCALE 1/8" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: E. MCCULLOUGH
DRAWN BY: E. MCCULLOUGH
CHECKED BY: B. GORUP
SUBMITTED BY:
ISSUE DATE: 9/23/24
SOLICITATION NO.:
CONTRACT NO.:
SIZE: ANSI D

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE, OMAHA, NE 68102

ACCESS CONTROL POINT (ACP) STANDARD DESIGN CONCEPTS

CONCEPTUAL COMMAND & CONTROL W/ SEARCH FLOOR PLAN

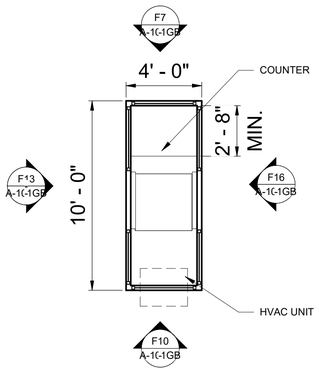
SHEET ID
A-101CS

GENERAL NOTES:
1. THIS CONCEPTUAL FLOOR PLAN REPRESENTS A FUNCTIONAL ARRANGEMENT, BUT IS NOT A REQUIRED LAYOUT.
2. DIFFERENT ROOF DESIGNS ARE ALLOWED, COMPLY WITH UFC 3-110-03. LOW SLOPE ROOFING IS ACCEPTABLE, IF APPROVED BY THE INSTALLATION FACILITY STANDARDS.

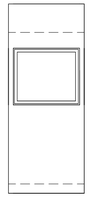
GUARD BOOTH AND PEDESTRIAN ID CHECK NOTES:
1. COUNTER HEIGHT SHALL BE A MINIMUM OF 34" HIGH FROM FINISH FLOOR.
2. MEET THE MINIMUM OF UL 752 LEVEL 3 FOR BALLISTIC RESISTANCE.
3. HVAC UNITS CAN BE MOUNTED THROUGH THE WALL OR ROOF MOUNTED. UNITS MUST MEET THE MINIMUM BALLISTIC RESISTANCE.

BUILDING/SITE FUNCTIONS:	THIS CONCEPT PROVIDES THE FUNCTIONS:	
VISITOR CONTROL CENTER (VCC)		
GUARD BOOTHS	■	
SEARCH BUILDING AREA		
COMMAND AND CONTROL		
ID CHECK AREA		
SEARCH AREA		
OVERWATCH		
TOILET		
COMMUNICATIONS		
MECHANICAL/ELECTRICAL		
STORAGE		

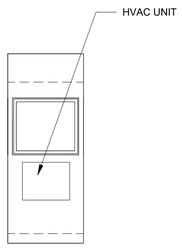
BUILDING/SITE FUNCTION NOTES:
1. SEE ACP STANDARD DESIGN 1.4.1/1.4.2 FOR ADDITIONAL INFORMATION.



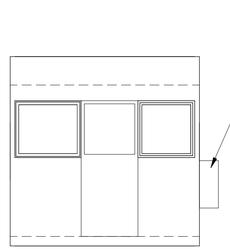
F1 CONCEPTUAL GUARD BOOTH FLOOR PLAN
1/4" = 1'-0"



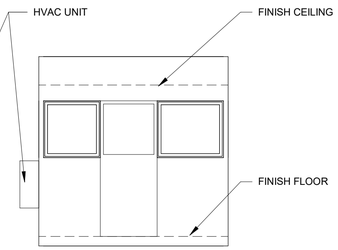
F7 FRONT ELEVATION
1/4" = 1'-0"



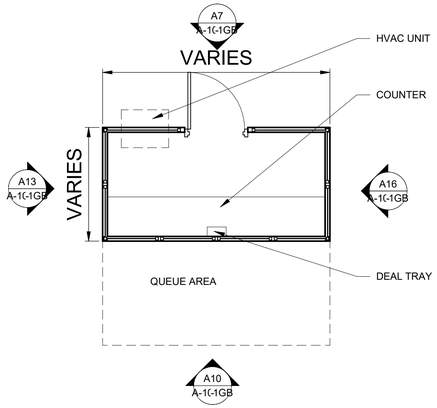
F10 BACK ELEVATION
1/4" = 1'-0"



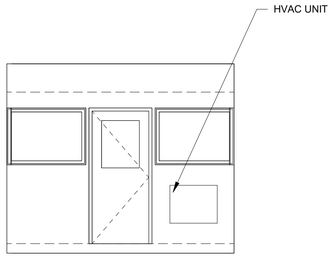
F13 SIDE ELEVATION
1/4" = 1'-0"



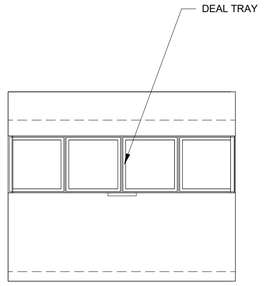
F16 SIDE ELEVATION
1/4" = 1'-0"



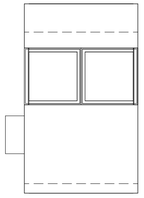
A1 CONCEPTUAL PEDESTRIAN ID CHECK FLOOR PLAN
1/4" = 1'-0"



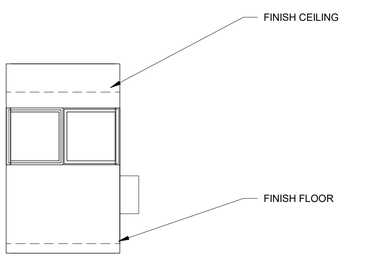
A7 BACK ELEVATION
1/4" = 1'-0"



A10 FRONT ELEVATION
1/4" = 1'-0"



A13 SIDE ELEVATION
1/4" = 1'-0"



A16 SIDE ELEVATION
1/4" = 1'-0"

0 2' 4' 8'
SCALE 1/4" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: E. MCCULLOUGH
DRAWN BY: E. MCCULLOUGH
CHECKED BY: B. GORUP
SUBMITTED BY:
SIZE: ANSI D

ISSUE DATE: 9/23/24
SOLICITATION NO.:
CONTRACT NO.:

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE, OMAHA, NE 68102

ACCESS CONTROL POINT (ACP) STANDARD DESIGN CONCEPTS

CONCEPTUAL GUARD BOOTH AND PEDESTRIAN ID CHECK LAYOUT

SHEET ID
A-101GB

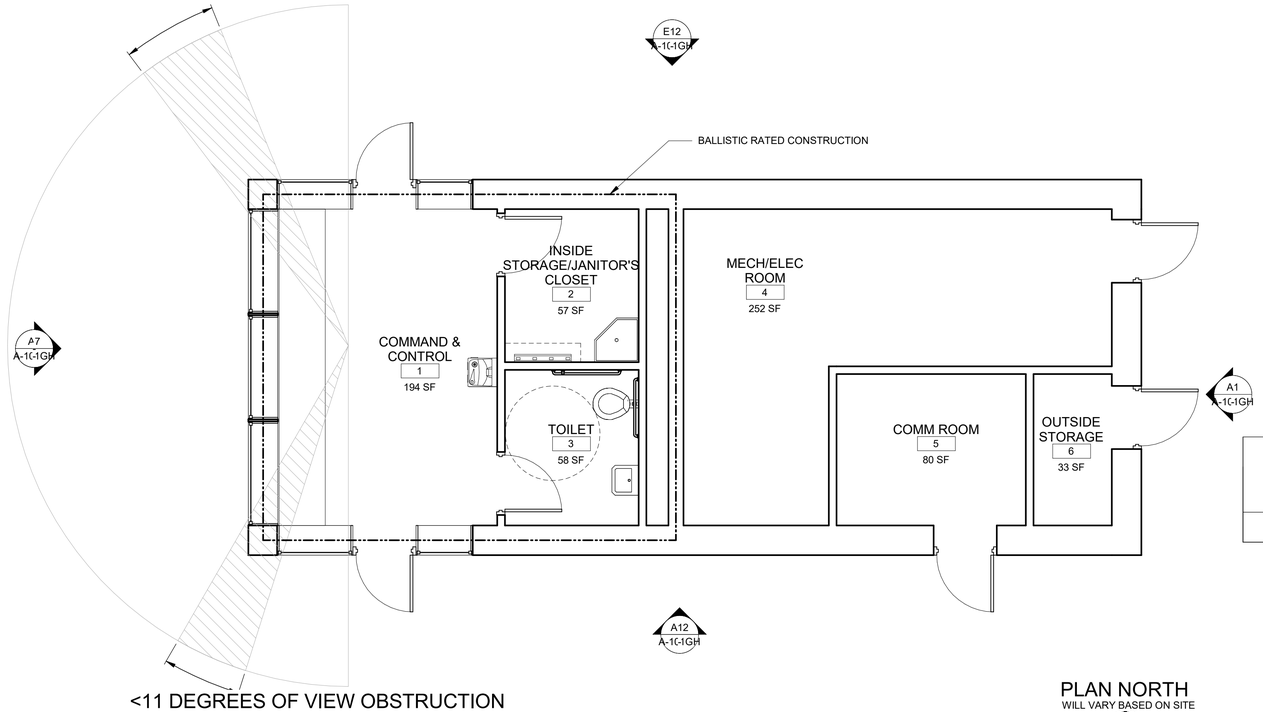
GENERAL NOTES:
1. THIS CONCEPTUAL FLOOR PLAN REPRESENTS A FUNCTIONAL ARRANGEMENT, BUT IS NOT A REQUIRED LAYOUT.
2. ALL WALLS CAN BE ADJUSTED TO MEET THE NEEDS OF THE SPECIFIC INSTALLATION AND TO COMPLY WITH THE INSTALLATION FACILITY STANDARDS.
3. DIFFERENT ROOF DESIGNS ARE ALLOWED,COMPLY WITH UFC 3-110-03. LOW SLOPE ROOFING IS ACCEPTABLE, IF APPROVED BY THE INSTALLATION FACILITY STANDARDS.

FUNCTIONAL AREAS (WITH AREA SQUARE FOOTAGE (SF) AND NOTES):
1. COMMAND & CONTROL (REQUIRES BALLISTIC RATED CONSTRUCTION UL 752 LEVEL 3 MINIMUM. NOT LESS THAN 150 SF)
2. TOILET (NO LESS THAN 48 SF, COMPLY WITH ARCHITECTURAL BARRIERS ACT)
3. INSIDE STORAGE/JANITOR'S CLOSET (SF IS BASED ON USER REQUIREMENTS)
4. MECHANICAL/ELECTRICAL (SF IS BASED ON USER OR BUILDING REQUIREMENTS)
5. COMM ROOM (SEE UFC 3-580-01 FOR SF REQUIREMENTS. IN ADDITION, SIZE ACCORDING TO USER AND EQUIPMENT NEEDS.)
6. OUTSIDE STORAGE (BASED ON USER REQUIREMENTS)
7. SEE ARMY STANDARD DESIGN FOR NURSING MOTHER'S ROOM REQUIREMENTS.

BUILDING/SITE FUNCTIONS:	THIS CONCEPT PROVIDES THE FUNCTIONS:
VISITOR CONTROL CENTER (VCC)	
GUARD BOOTHS	
SEARCH BUILDING AREA	
COMMAND AND CONTROL	■
ID CHECK AREA	
SEARCH AREA	
OVERWATCH	
TOILET	■
COMMUNICATIONS	■
MECHANICAL/ELECTRICAL	■
STORAGE	■

BUILDING/SITE FUNCTION NOTES:
1. COMBINING FUNCTIONS/BUILDINGS IS ACCEPTABLE.
2. SEE ACP STANDARD DESIGN 1.4.1/1.4.2 FOR ADDITIONAL INFORMATION.

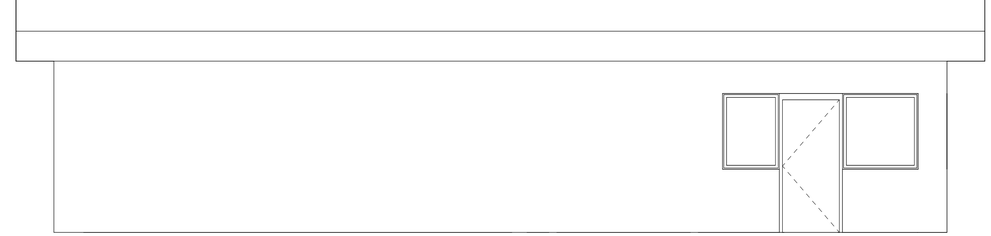
PROVIDE LESS THAN OR EQUAL TO 11 DEGREES OF VIEW OBSTRUCTION. PROVIDE CCTV IN OBSTRUCTED VIEW AS NEEDED.



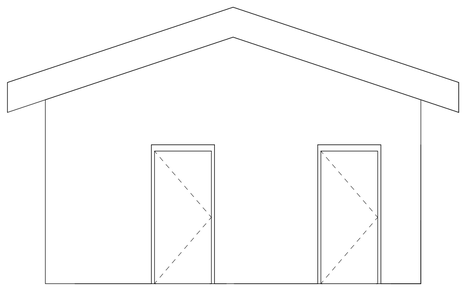
PLAN NORTH
WILL VARY BASED ON SITE

E1 CONCEPTUAL GATEHOUSE FLOOR PLAN
1/4" = 1'-0"

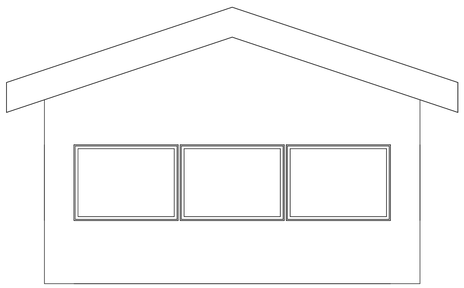
BUILDING GROSS SQUARE FOOTAGE: 936 SF



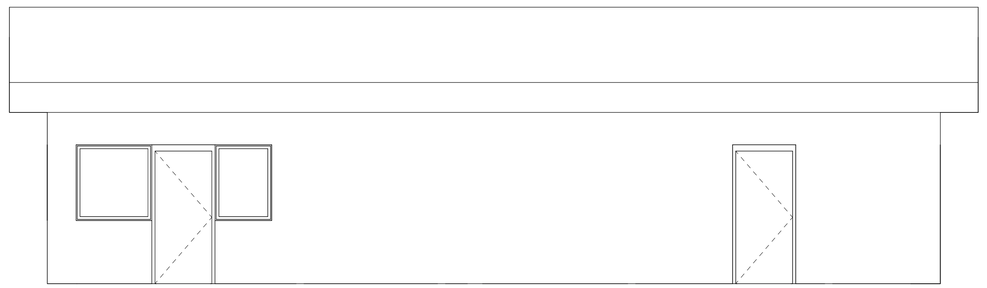
E12 NORTH ELEVATION
1/4" = 1'-0"



A1 EAST ELEVATION
1/4" = 1'-0"



A7 WEST ELEVATION
1/4" = 1'-0"



A12 SOUTH ELEVATION
1/4" = 1'-0"

0 2' 4' 8'

SCALE 1/4" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

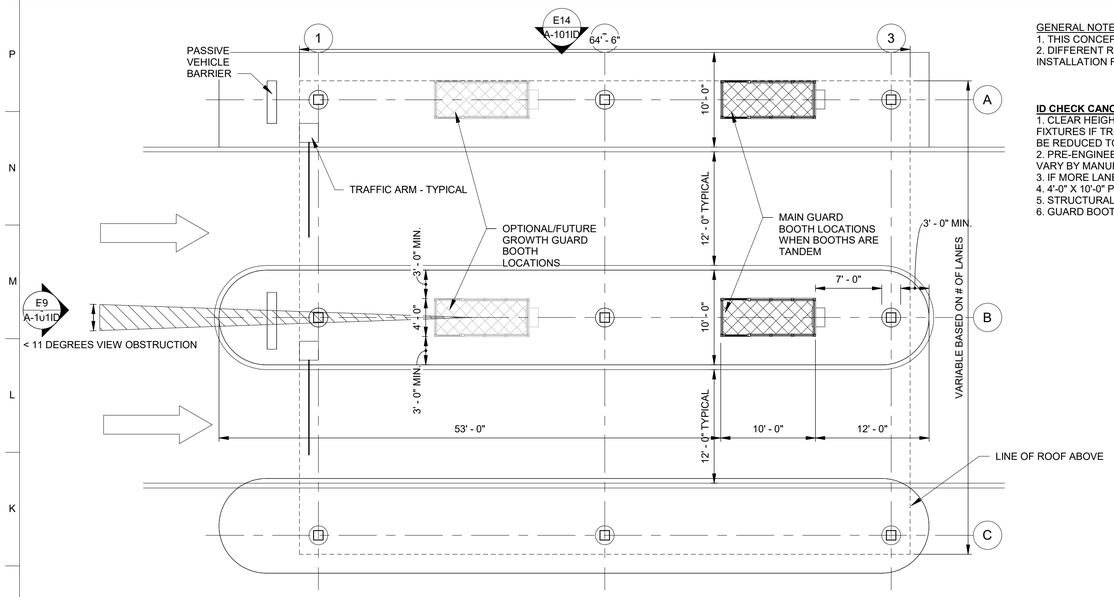
DESIGNED BY: E. MCCULLOUGH
DRAWN BY: E. MCCULLOUGH
CHECKED BY: B. GORUP
SUBMITTED BY:
ISSUE DATE: 9/23/24
SOLICITATION NO.:
CONTRACT NO.:
SIZE: ANSI D

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE, OMAHA, NE 68102

ACCESS CONTROL POINT (ACP) STANDARD DESIGN CONCEPTS

CONCEPTUAL GATEHOUSE LAYOUT

SHEET ID
A-101GH



CONCEPTUAL TANDEM ID CHECK CANOPY FLOOR PLAN

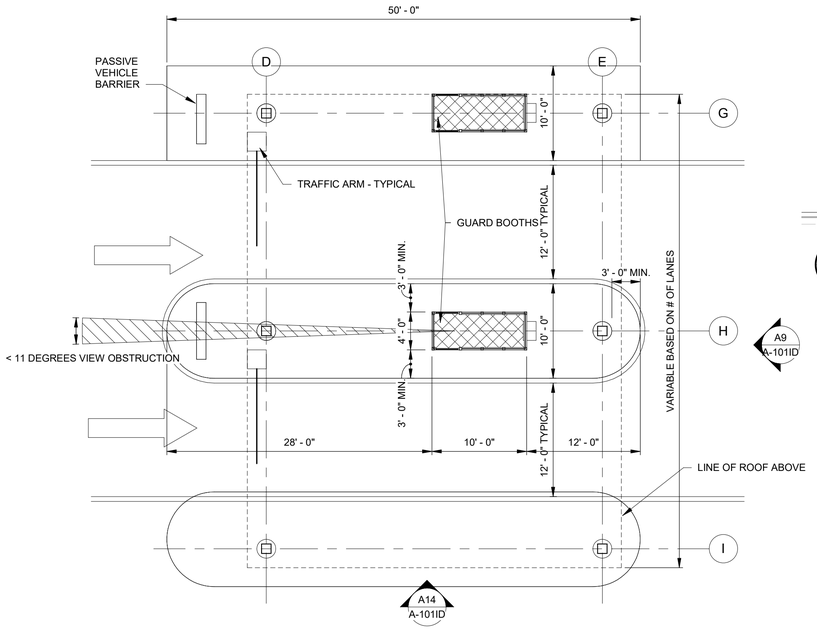
H1 1/8" = 1'-0"

GENERAL NOTES:
1. THIS CONCEPTUAL FLOOR PLAN REPRESENTS A FUNCTIONAL ARRANGEMENT, BUT IS NOT A REQUIRED LAYOUT.
2. DIFFERENT ROOF DESIGNS ARE ALLOWED, COMPLY WITH UFC 3-110-03. LOW SLOPE ROOFING IS ACCEPTABLE, IF APPROVED BY THE INSTALLATION FACILITY STANDARDS.

ID CHECK CANOPY NOTES:
1. CLEAR HEIGHT OF CANOPY SHALL BE 17'-6" ABOVE VEHICULAR PAVEMENT INCLUDING PENDANT MOUNTED DEVICES ON LIGHT FIXTURES IF TRUCKS ENTER THE ID CHECK AREA. IF ONLY PASSENGER CARS ARE TO USE THE ID CHECK AREA THE CLEAR HEIGHT CAN BE REDUCED TO 15'-0" ABOVE PAVEMENT.
2. PRE-ENGINEERED FRAME DIMENSIONS ARE TO OUTSIDE FACE OF GIRT AT OVERHANGS EXTENDING BEYOND COLUMNS. DIMENSIONS VARY BY MANUFACTURER.
3. IF MORE LANES ARE REQUIRED, DUPLICATE LAYOUT AS NEEDED.
4. 4'-0" X 10'-0" PRE-ENGINEERED GUARD BOOTHS MUST BE ANCHORED TO PAVEMENT.
5. STRUCTURAL COLUMNS BASED ON SITE/GEOGRAPHIC LOCATION REQUIREMENTS.
6. GUARD BOOTHS ARE REQUIRED TO MEET AT LEAST UL 752 LEVEL 3 BALLISTIC RATED CONSTRUCTION.

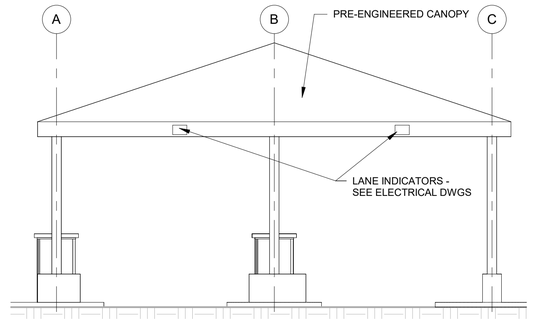
BUILDING/SITE FUNCTIONS:	THIS CONCEPT PROVIDES THE FUNCTIONS:
VISITOR CONTROL CENTER (VCC)	
GUARD BOOTHS	■
SEARCH BUILDING AREA	
COMMAND AND CONTROL	
ID CHECK AREA	■
SEARCH AREA	
OVERWATCH	
TOILET	
COMMUNICATIONS	
MECHANICAL/ELECTRICAL	
STORAGE	

BUILDING/SITE FUNCTION NOTES:
1. SEE ACP STANDARD DESIGN 1.4.1/1.4.2 FOR ADDITIONAL INFORMATION.



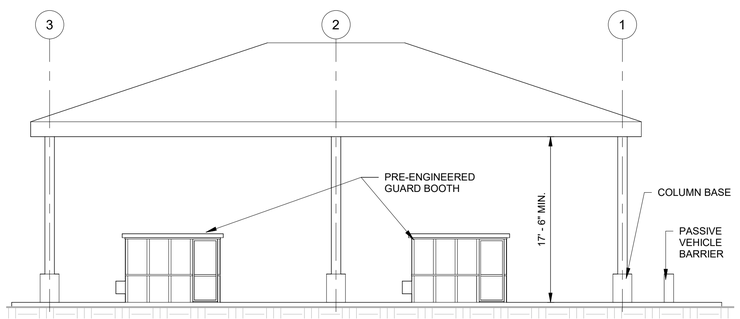
CONCEPTUAL SINGLE ID CHECK CANOPY FLOOR PLAN

A1 1/8" = 1'-0"



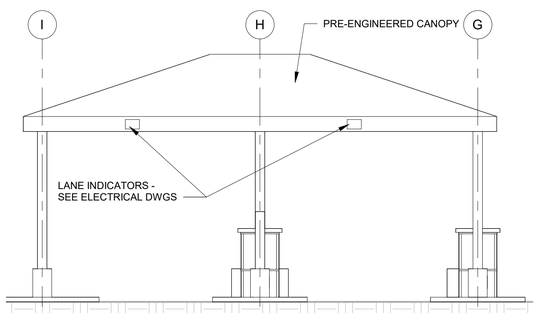
TANDEM WEST ELEVATION

E9 1/8" = 1'-0"



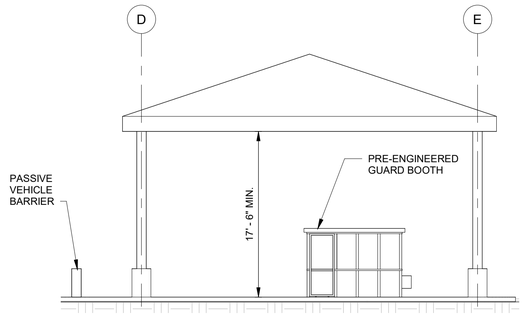
TANDEM NORTH ELEVATION

E14 1/8" = 1'-0"



SINGLE EAST ELEVATION

A9 1/8" = 1'-0"



SINGLE SOUTH ELEVATION

A14 1/8" = 1'-0"

0 2' 4' 8'

SCALE 1/8" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: E. MCCULLOUGH
DRAWN BY: E. MCCULLOUGH
CHECKED BY: B. GORUP
SUBMITTED BY:
ISSUE DATE: 9/23/24
SOLICITATION NO.:
CONTRACT NO.:
SIZE: ANSI D

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE, OMAHA, NE 68102

ACCESS CONTROL POINT (ACP) STANDARD DESIGN CONCEPTS

CONCEPTUAL ID CHECK LAYOUT

SHEET ID

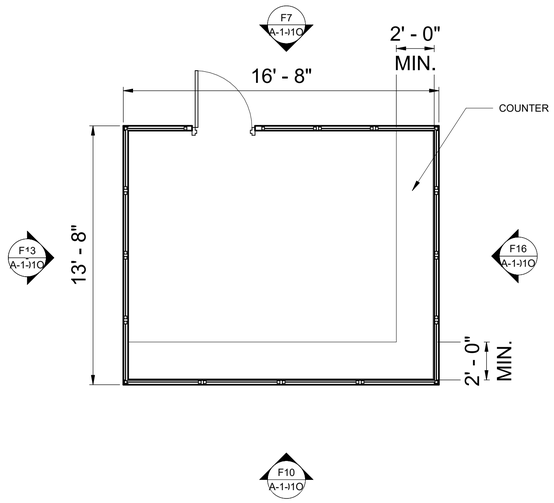
A-101ID

GENERAL NOTES:
1. THIS CONCEPTUAL FLOOR PLAN REPRESENTS A FUNCTIONAL ARRANGEMENT, BUT IS NOT A REQUIRED LAYOUT.
2. DIFFERENT ROOF DESIGNS ARE ALLOWED, COMPLY WITH UFC 3-110-03. FLAT OR LOW SLOPE ROOFING IS ACCEPTABLE, IF APPROVED BY THE INSTALLATION FACILITY STANDARDS.

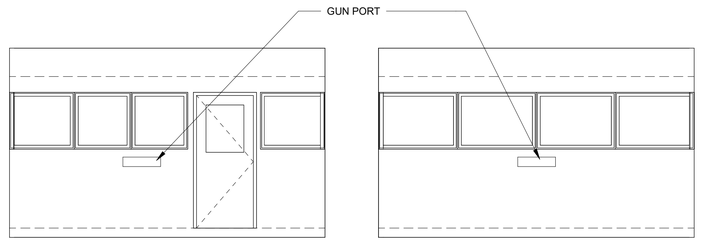
OVERWATCH NOTES:
1. COUNTER HEIGHT SHALL BE A MINIMUM OF 34" HIGH FROM FINISH FLOOR.
2. MEET THE MINIMUM OF UL 752 LEVEL 3 FOR BALLISTIC RATING FOR ALL OF OVERWATCH PERIMETER.
3. HVAC UNITS CAN BE MOUNTED THROUGH THE WALL OR ROOF MOUNTED. UNITS NEED TO MEET THE MINIMUM BALLISTIC RESISTANCE.

BUILDING/SITE FUNCTIONS:	THIS CONCEPT PROVIDES THE FUNCTIONS:
VISITOR CONTROL CENTER (VCC)	
GUARD BOOTHS	
SEARCH BUILDING AREA	
COMMAND AND CONTROL	
ID CHECK AREA	
SEARCH AREA	
OVERWATCH	■
TOILET	
COMMUNICATIONS	
MECHANICAL/ELECTRICAL	
STORAGE	

BUILDING/SITE FUNCTION NOTES:
1. SEE ACP STANDARD DESIGN 1.4.1/1.4.2 FOR ADDITIONAL INFORMATION.

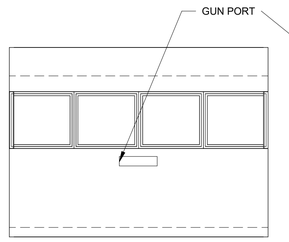


F1 CONCEPTUAL OVERWATCH W/ COMMAND & CONTROL FLOOR PLAN
1/4" = 1'-0"

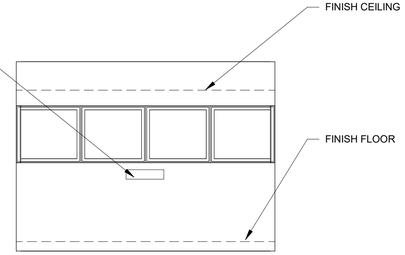


F7 BACK ELEVATION
1/4" = 1'-0"

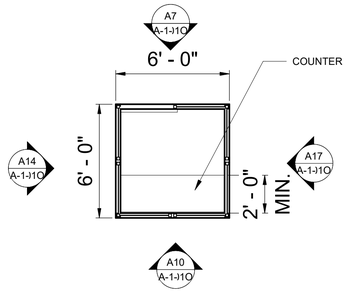
F10 FRONT ELEVATION
1/4" = 1'-0"



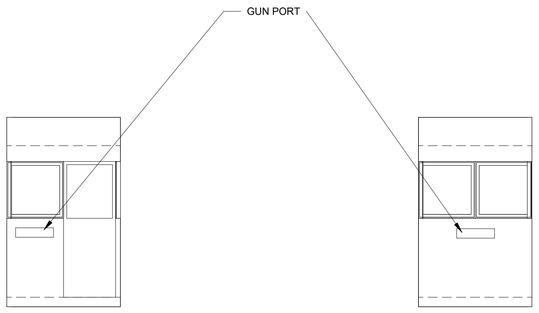
F13 SIDE ELEVATION
1/4" = 1'-0"



F16 SIDE ELEVATION
1/4" = 1'-0"

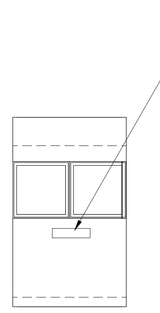


A1 CONCEPTUAL OVERWATCH FLOOR PLAN
1/4" = 1'-0"

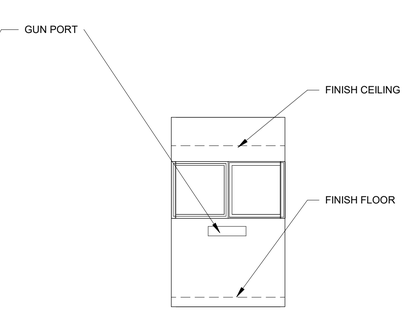


A7 BACK ELEVATION
1/4" = 1'-0"

A10 FRONT ELEVATION
1/4" = 1'-0"



A14 SIDE ELEVATION
1/4" = 1'-0"



A17 SIDE ELEVATION
1/4" = 1'-0"

0 2' 4' 8'

SCALE 1/4" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: E. MCCULLOUGH
DRAWN BY: E. MCCULLOUGH
CHECKED BY: B. GORUP
SUBMITTED BY:
ISSUE DATE: 9/23/24
SOLICITATION NO.:
CONTRACT NO.:
SIZE: ANSI D

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE, OMAHA, NE 68102

ACCESS CONTROL POINT (ACP) STANDARD DESIGN CONCEPTS

CONCEPTUAL OVERWATCH & OVERWATCH W/ COMMAND & CONTROL LAYOUT

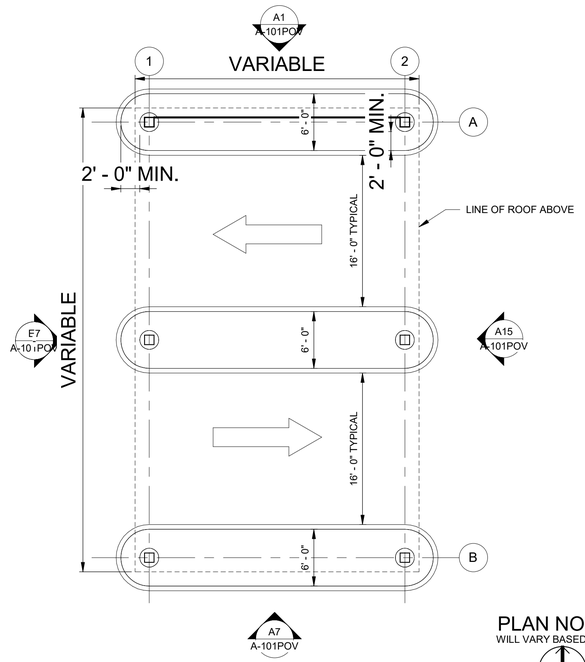
SHEET ID
A-101O

GENERAL NOTES:
1. THIS CONCEPTUAL FLOOR PLAN REPRESENTS A FUNCTIONAL ARRANGEMENT, BUT IS NOT A REQUIRED LAYOUT.
2. DIFFERENT ROOF DESIGNS ARE ALLOWED, COMPLY WITH UFC 3-110-03. LOW SLOPE ROOFING IS ACCEPTABLE, IF APPROVED BY THE INSTALLATION FACILITY STANDARDS.

PASSENGER VEHICLE SEARCH CANOPY NOTES:
1. CLEAR HEIGHT OF CANOPY SHALL BE 15'-0" ABOVE VEHICULAR PAVEMENT INCLUDING PENDANT MOUNTED DEVICES ON LIGHT FIXTURES.
2. STRUCTURAL COLUMNS BASED ON SITE/GEOGRAPHIC LOCATION REQUIREMENTS.

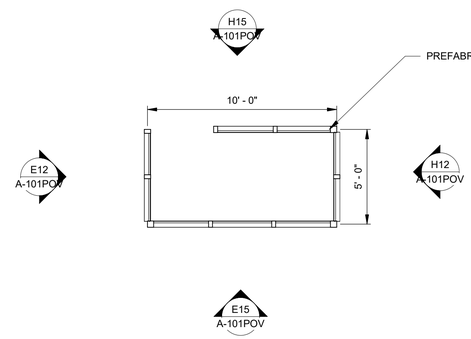
BUILDING/SITE FUNCTIONS:	THIS CONCEPT PROVIDES THE FUNCTIONS:
VISITOR CONTROL CENTER (VCC)	
GUARD BOOTHS	
SEARCH BUILDING AREA	
COMMAND AND CONTROL	
ID CHECK AREA	
SEARCH AREA	■
OVERWATCH	
TOILET	
COMMUNICATIONS	
MECHANICAL/ELECTRICAL	
STORAGE	

BUILDING/SITE FUNCTION NOTES:
1. COMBINING FUNCTIONS/BUILDINGS IS ACCEPTABLE.
2. SEE ACP STANDARD DESIGN 1.4.1/1.4.2 FOR ADDITIONAL INFORMATION.

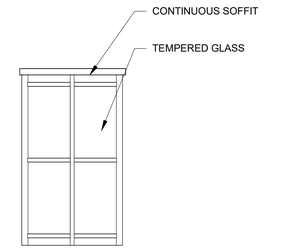


PLAN NORTH
WILL VARY BASED ON SITE

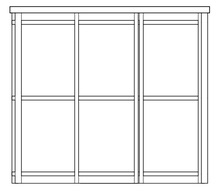
E1 CONCEPTUAL PASSENGER VEHICLE SEARCH CANOPY FLOOR PLAN
1/8" = 1'-0"



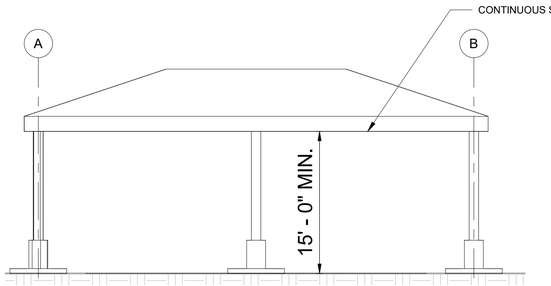
H7 CONCEPTUAL SEARCH SHELTER
1/4" = 1'-0"



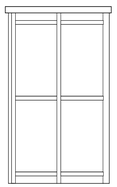
H12 EAST ELEVATION
1/4" = 1'-0"



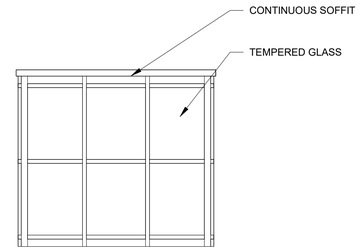
H15 NORTH ELEVATION
1/4" = 1'-0"



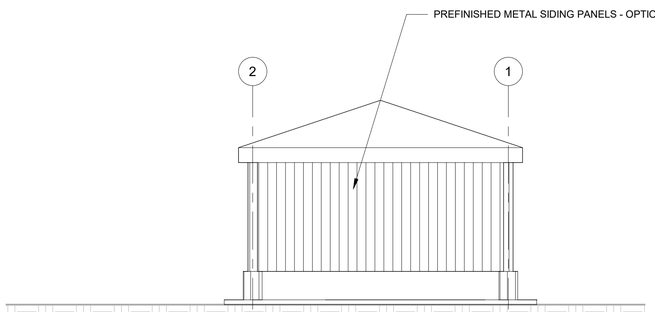
E7 WEST ELEVATION
1/8" = 1'-0"



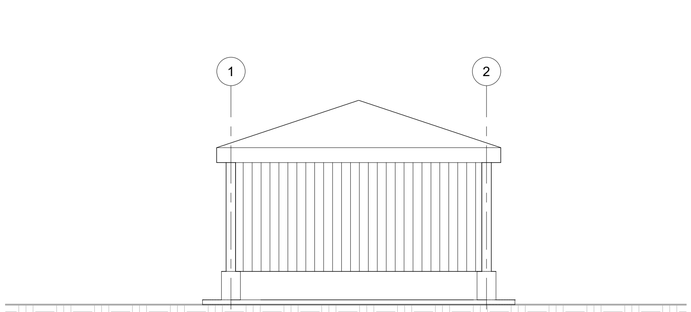
E12 WEST ELEVATION
1/4" = 1'-0"



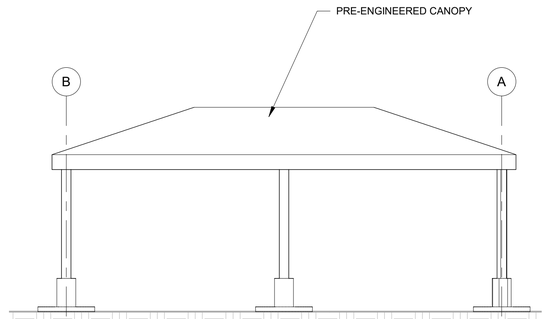
E15 SOUTH ELEVATION
1/4" = 1'-0"



A1 NORTH ELEVATION
1/8" = 1'-0"



A7 SOUTH ELEVATION
1/8" = 1'-0"



A15 EAST ELEVATION
1/8" = 1'-0"

0 2' 4' 8'
SCALE 1/4" = 1'-0"

0 4' 8' 16'
SCALE 1/8" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: E. MCCULLOUGH
DRAWN BY: E. MCCULLOUGH
CHECKED BY: B. CORLIP
SUBMITTED BY:
ISSUE DATE: 9/23/24
SOLICITATION NO.:
CONTRACT NO.:
SIZE: ANSI D

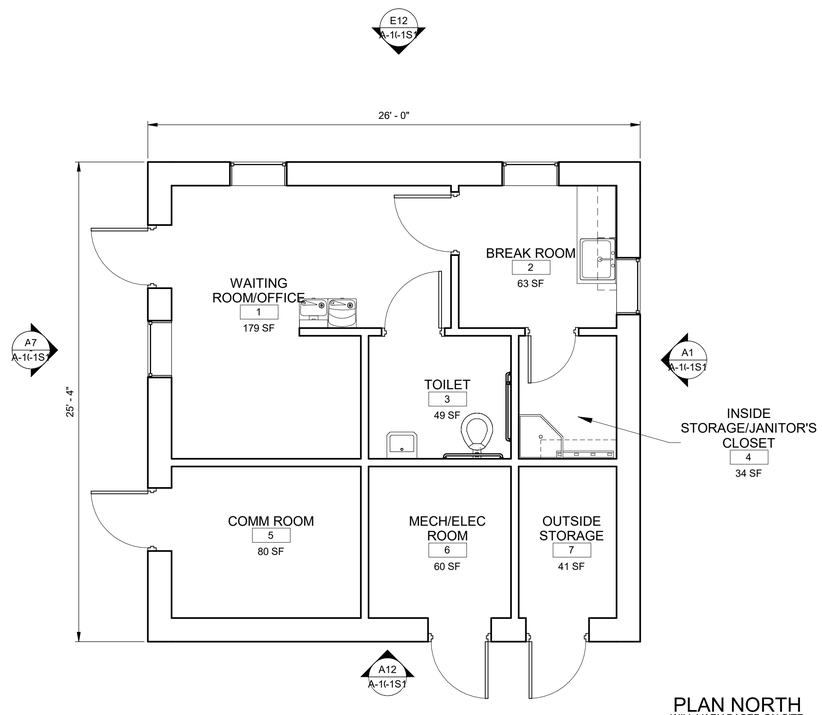
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE, OMAHA, NE 68102

ACCESS CONTROL POINT (ACP) STANDARD DESIGN CONCEPTS

CONCEPTUAL PASSENGER VEHICLE SEARCH CANOPY LAYOUT

SHEET ID
A-101POV

GENERAL NOTES:
1. THIS CONCEPTUAL FLOOR PLAN REPRESENTS A FUNCTIONAL ARRANGEMENT, BUT IS NOT A REQUIRED LAYOUT.
2. ALL WALLS CAN BE ADJUSTED TO MEET THE NEEDS OF THE SPECIFIC INSTALLATION.
3. DIFFERENT ROOF DESIGNS ARE ALLOWED, COMPLY WITH UFC 3-110-03. LOW SLOPE ROOFING IS ACCEPTABLE, IF APPROVED BY THE INSTALLATION FACILITY STANDARDS.



PLAN NORTH
WILL VARY BASED ON SITE

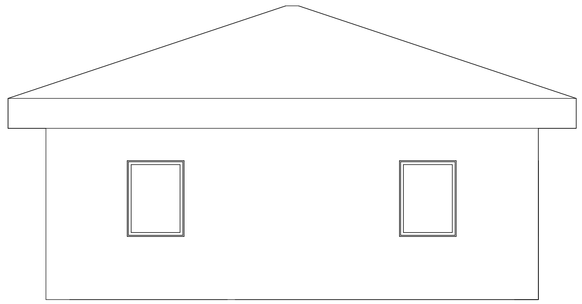
E1 CONCEPTUAL SMALL SEARCH AREA BUILDING FLOOR PLAN
1/4" = 1'-0"

BUILDING GROSS SQUARE FOOTAGE: 660 SF

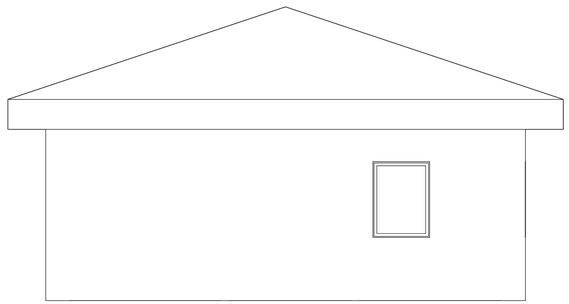
FUNCTIONAL AREAS (WITH AREA SQUARE FOOTAGE (SF) AND NOTES):
1. WAITING ROOM/OFFICE (BASED ON USER NEEDS)
2. BREAK ROOM (NO LESS THAN 100 SF)
3. TOILET (NO LESS THAN 48 SF, COMPLY WITH ARCHITECTURAL BARRIERS ACT)
4. INSIDE STORAGE/JANITOR'S CLOSET (SF IS BASED ON USER REQUIREMENTS)
5. COMM ROOM (SEE UFC 3-580-01 FOR SF REQUIREMENTS. IN ADDITION, SIZE ACCORDING TO USER AND EQUIPMENT NEEDS.)
6. MECHANICAL/ELECTRICAL (SF IS BASED USER REQUIREMENTS)
7. OUTSIDE STORAGE (BASED ON USER AND BUILDING REQUIREMENTS)
8. SEE ARMY STANDARD DESIGN FOR NURSING MOTHER'S ROOM REQUIREMENTS.

BUILDING/SITE FUNCTIONS:	THIS CONCEPT PROVIDES THE FUNCTIONS:
VISITOR CONTROL CENTER (VCC)	
GUARD BOOTHS	
SEARCH BUILDING AREA	■
COMMAND AND CONTROL	
ID CHECK AREA	
SEARCH AREA	
OVERWATCH	
TOILET	■
COMMUNICATIONS	■
MECHANICAL/ELECTRICAL	■
STORAGE	■

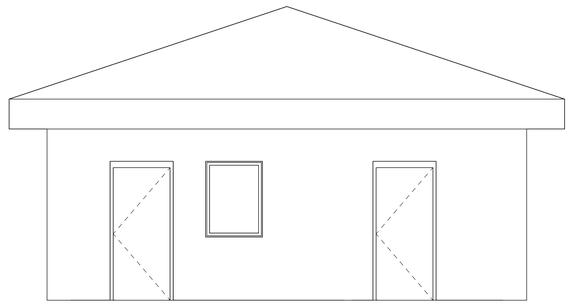
BUILDING/SITE FUNCTION NOTES:
1. COMBINING FUNCTIONS/BUILDINGS IS ACCEPTABLE.
2. SEE ACP STANDARD DESIGN 1.4.1/1.4.2 FOR ADDITIONAL INFORMATION.



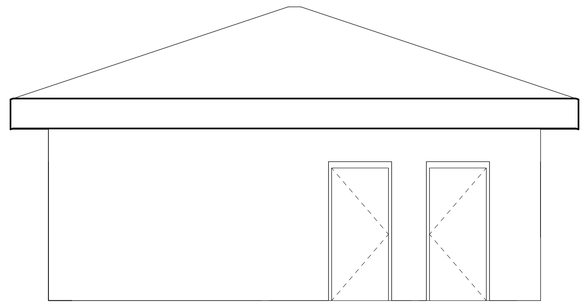
E12 NORTH ELEVATION
1/4" = 1'-0"



A1 EAST ELEVATION
1/4" = 1'-0"



A7 WEST ELEVATION
1/4" = 1'-0"



A12 SOUTH ELEVATION
1/4" = 1'-0"

0 2' 4' 8'
SCALE 1/4" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: E. MCCULLOUGH
DRAWN BY: E. MCCULLOUGH
CHECKED BY: B. GORUP
SUBMITTED BY:
ISSUE DATE: 9/23/24
SOLICITATION NO.:
CONTRACT NO.:
SIZE: ANSI D

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE, OMAHA, NE 68102

ACCESS CONTROL POINT (ACP) STANDARD DESIGN CONCEPTS

CONCEPTUAL SMALL SEARCH AREA BUILDING LAYOUT

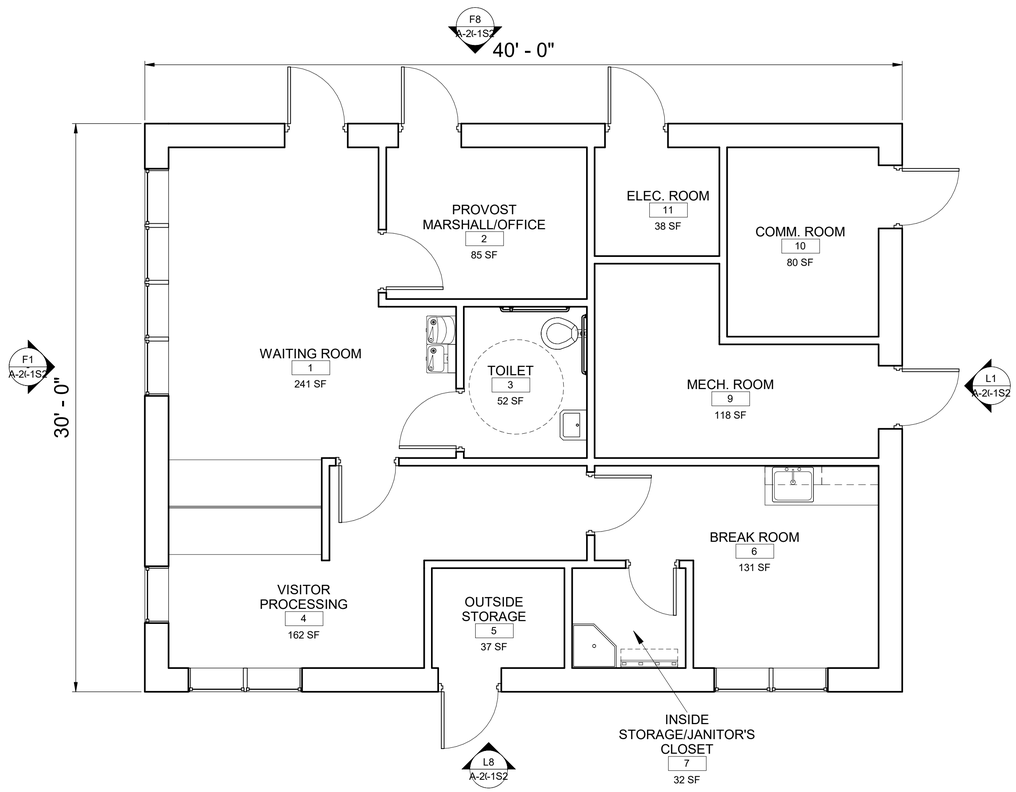
SHEET ID
A-101S1

GENERAL NOTES:
1. THIS CONCEPTUAL FLOOR PLAN REPRESENTS A FUNCTIONAL ARRANGEMENT, BUT IS NOT A REQUIRED LAYOUT.
2. ALL WALLS CAN BE ADJUSTED TO MEET THE NEEDS OF THE SPECIFIC INSTALLATION.
3. DIFFERENT ROOF DESIGNS ARE ALLOWED, COMPLY WITH UFC 3-110-03. LOW SLOPE ROOFING IS ACCEPTABLE, IF APPROVED BY THE INSTALLATION FACILITY STANDARDS.

FUNCTIONAL AREAS (WITH AREA SQUARE FOOTAGE (SF) AND NOTES):
1. WAITING ROOM (NO LESS THAN 110 SF)
2. PROVOST MARSHALL ROOM (NO LESS THAN 80 SF)
3. VISITOR PROCESSING: (NO LESS THAN 120 SF)
4. TOILET (NO LESS THAN 48 SF, COMPLY WITH ARCHITECTURAL BARRIERS ACT)
5. BREAK ROOM (NO LESS THAN 110 SF)
6. COMM ROOM (SEE UFC 3-580-01 FOR SF REQUIREMENTS. IN ADDITION, SIZE ACCORDING TO USER NEEDS.)
7. MECHANICAL ROOM (SF IS BASED ON USER AND BUILDING REQUIREMENTS)
8. ELECTRICAL ROOM (SF IS BASED ON USER AND BUILDING REQUIREMENTS)
9. INSIDE STORAGE/JANITOR'S CLOSET (SF IS BASED ON USER REQUIREMENTS)
10. OUTSIDE STORAGE (BASED ON USER REQUIREMENTS)
11. X-RAY/METAL DETECTOR AREA (IF USER REQUIRES. NO LESS THAN 90 SF)
12. SEE ARMY STANDARD DESIGN FOR NURSING MOTHER'S ROOM REQUIREMENTS.

BUILDING/SITE FUNCTIONS:	THIS CONCEPT PROVIDES THE FUNCTIONS:
VISITOR CONTROL CENTER (VCC)	
GUARD BOOTHS	
SEARCH BUILDING AREA	■
COMMAND AND CONTROL	
ID CHECK AREA	
SEARCH AREA	
OVERWATCH	
TOILET	■
COMMUNICATIONS	■
MECHANICAL/ELECTRICAL	■
STORAGE	■

BUILDING/SITE FUNCTION NOTES:
1. COMBINING FUNCTIONS/BUILDINGS IS ACCEPTABLE.
2. SEE ACP STANDARD DESIGN 1.4.1/1.4.2 FOR ADDITIONAL INFORMATION.

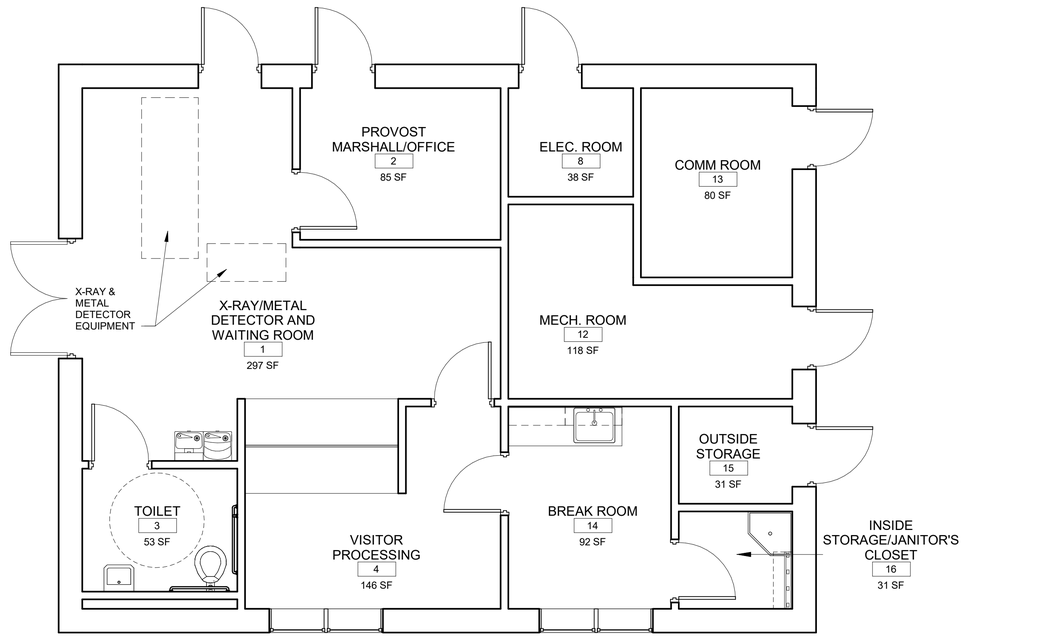


CONCEPTUAL LARGE SEARCH AREA BUILDING FLOOR PLAN

A1

1/4" = 1'-0"

BUILDING GROSS SQUARE FOOTAGE: 1200 SF



ALT CONCEPTUAL LARGE SEARCH AREA BUILDING FLOOR PLAN

A10

1/4" = 1'-0"

PLAN NORTH
WILL VARY BASED ON SITE

0 2' 4' 8'
SCALE 1/4" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: E. MCCULLOUGH
DRAWN BY: E. MCCULLOUGH
CHECKED BY: B. GORUP
SUBMITTED BY:
ISSUE DATE: 9/23/24
SOLICITATION NO.:
CONTRACT NO.:
SIZE: ANSI D

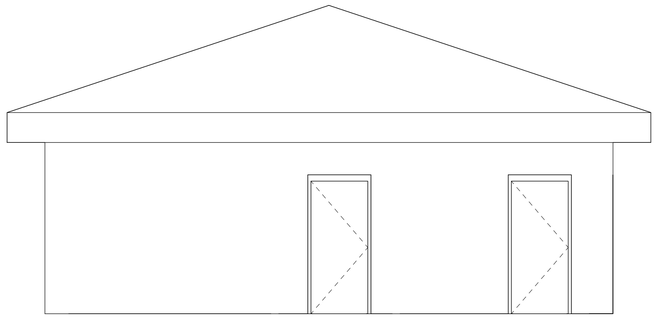
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE, OMAHA, NE 68102

ACCESS CONTROL POINT (ACP) STANDARD DESIGN CONCEPTS

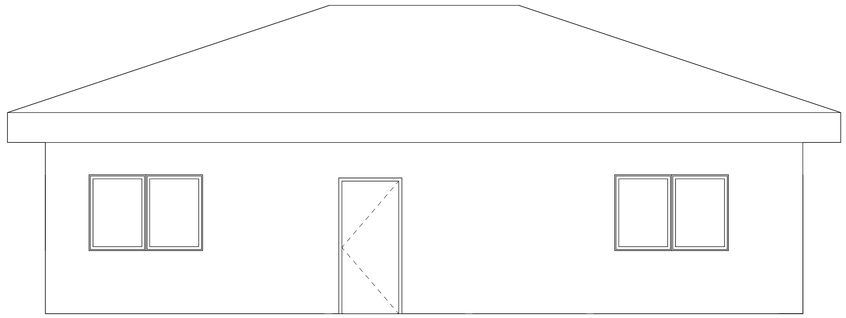
CONCEPTUAL LARGE SEARCH AREA BUILDING LAYOUT

SHEET ID

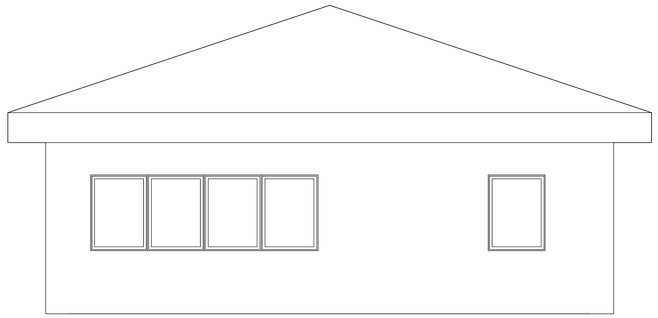
A-101S2



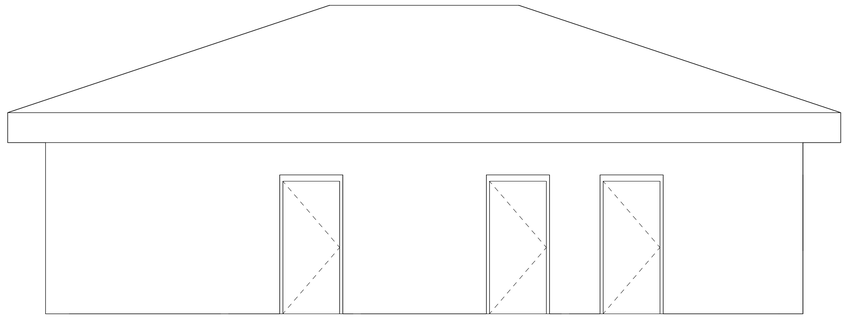
L1 EAST ELEVATION
1/4" = 1'-0"



L8 SOUTH ELEVATION
1/4" = 1'-0"



F1 WEST ELEVATION
1/4" = 1'-0"



F8 NORTH ELEVATION
1/4" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: E. MCCULLOUGH
DRAWN BY: E. MCCULLOUGH
CHECKED BY: B. GORUP
SUBMITTED BY:
SIZE: ANSI D
ISSUE DATE: 9/23/24
SOLICITATION NO.:
CONTRACT NO.:

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE, OMAHA, NE 68102

ACCESS CONTROL POINT (ACP) STANDARD DESIGN CONCEPTS

CONCEPTUAL LARGE SEARCH AREA BUILDING ELEVATIONS

SHEET ID

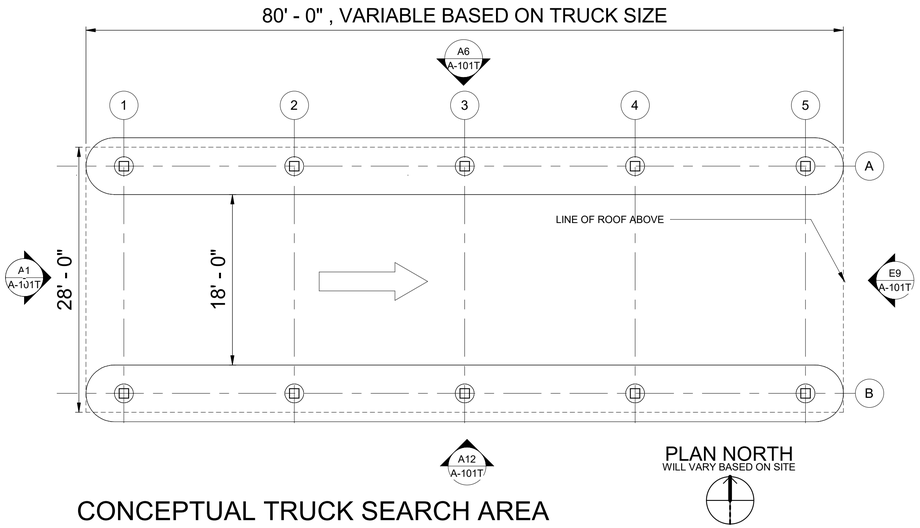
A-201S2

GENERAL NOTES:
1. THIS CONCEPTUAL FLOOR PLAN REPRESENTS A FUNCTIONAL ARRANGEMENT, BUT IS NOT A REQUIRED LAYOUT.
2. DIFFERENT ROOF DESIGNS ARE ALLOWED, COMPLY WITH UFC 3-110-03. LOW SLOPE ROOFING IS ACCEPTABLE, IF APPROVED BY THE INSTALLATION FACILITY STANDARDS.

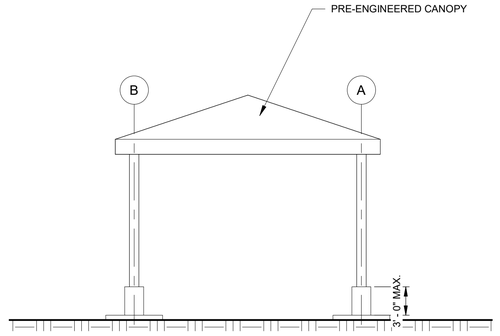
TRUCK SEARCH AREA CANOPY NOTES:
1. CLEAR HEIGHT OF CANOPY SHALL BE 17'-6" ABOVE VEHICULAR PAVEMENT INCLUDING PENDANT MOUNTED DEVICES ON LIGHT FIXTURES.
2. STRUCTURAL COLUMNS BASED ON SITE/GEOGRAPHIC LOCATION REQUIREMENTS.

BUILDING/SITE FUNCTIONS:	THIS CONCEPT PROVIDES THE FUNCTIONS:
VISITOR CONTROL CENTER (VCC)	
GUARD BOOTHS	
SEARCH BUILDING AREA	
COMMAND AND CONTROL	
ID CHECK AREA	
SEARCH AREA	■
OVERWATCH	
TOILET	
COMMUNICATIONS	
MECHANICAL/ELECTRICAL	
STORAGE	

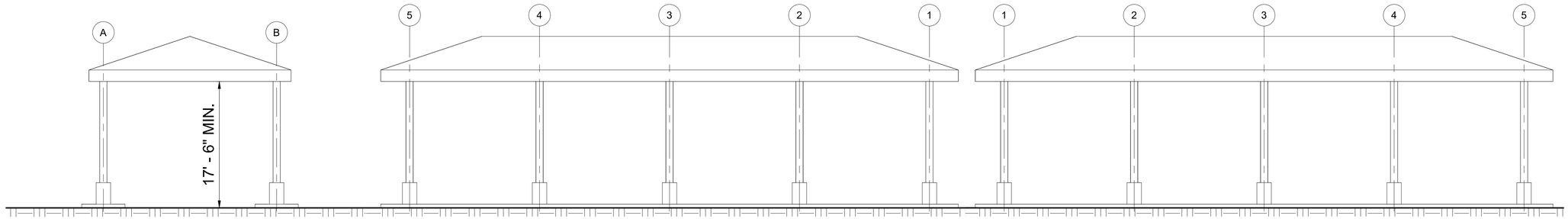
BUILDING/SITE FUNCTION NOTES:
1. COMBINING FUNCTIONS/BUILDINGS IS ACCEPTABLE.
2. SEE ACP STANDARD DESIGN 1.4.1/1.4.2 FOR ADDITIONAL INFORMATION.



E1 CONCEPTUAL TRUCK SEARCH AREA CANOPY FLOOR PLAN
1/8" = 1'-0"



E9 EAST ELEVATION
1/8" = 1'-0"



A1 WEST ELEVATION
1/8" = 1'-0"

A6 NORTH ELEVATION
1/8" = 1'-0"

A12 SOUTH ELEVATION
1/8" = 1'-0"

0 4' 8' 16'
SCALE 1/8" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: E. MCCULLOUGH
DRAWN BY: E. MCCULLOUGH
CHECKED BY: B. GORUP
SUBMITTED BY:
ISSUE DATE: 9/23/24
SOLICITATION NO.:
CONTRACT NO.:
SIZE: ANSI D

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE, OMAHA, NE 68102

ACCESS CONTROL POINT (ACP) STANDARD DESIGN CONCEPTS

CONCEPTUAL TRUCK SEARCH AREA CANOPY LAYOUT

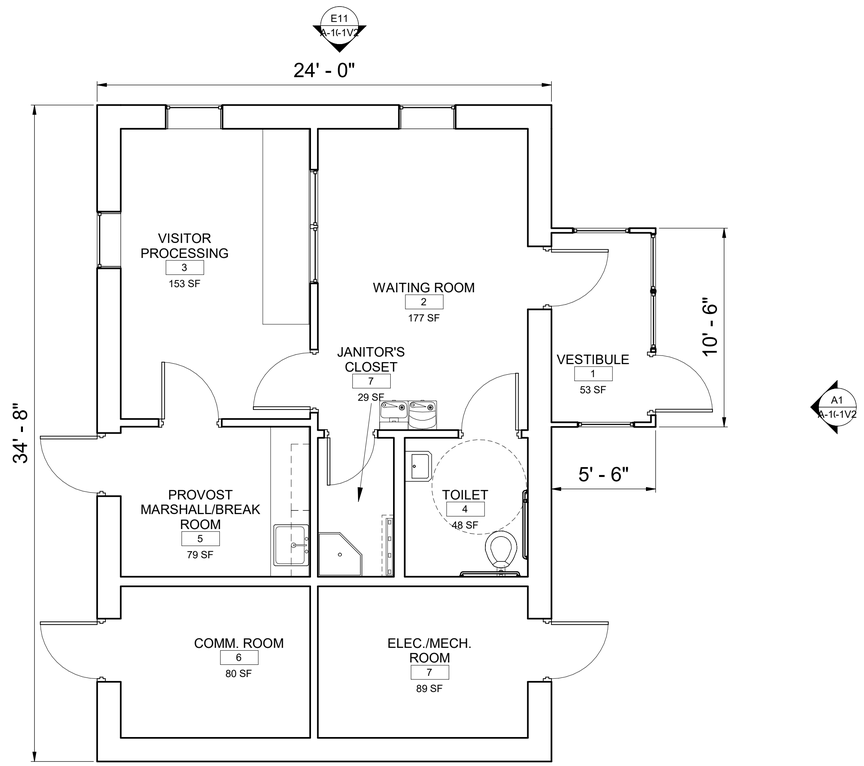
SHEET ID
A-101T

GENERAL NOTES:
1. THIS CONCEPTUAL FLOOR PLAN REPRESENTS A FUNCTIONAL ARRANGEMENT, BUT IS NOT A REQUIRED LAYOUT.
2. ALL WALLS CAN BE ADJUSTED TO MEET THE NEEDS OF THE SPECIFIC INSTALLATION.
3. DIFFERENT ROOF DESIGNS ARE ALLOWED, COMPLY WITH UFC 3-110-03.LOW SLOPE ROOFING IS ACCEPTABLE, IF APPROVED BY THE INSTALLATION FACILITY STANDARDS.

FUNCTIONAL AREAS (WITH AREA SQUARE FOOTAGE (SF) AND NOTES):
1. VESTIBULE (NO LESS THAN 50 SF)
2. WAITING ROOM (NO LESS THAN 150 SF)
2. VISITOR PROCESSING (NO LESS THAN 110 SF)
3. TOILET (NO LESS THAN 48 SF, COMPLY WITH ARCHITECTURAL BARRIERS ACT)
4. PROVOST MARSHALL/BREAK ROOM (NO LESS THAN 110 SF)
5. COMM ROOM (SEE UFC 3-580-01 FOR SF REQUIREMENTS. IN ADDITION, SIZE ACCORDING TO USER AND EQUIPMENT NEEDS.)
6. MECHANICAL/ELECTRICAL ROOM (SF IS BASED ON USER AND BUILDING REQUIREMENTS)
7. JANITOR'S CLOSET (BASED ON USER NEEDS)
7. SEE ARMY STANDARD DESIGN FOR NURSING MOTHER'S ROOM REQUIREMENTS.

BUILDING/SITE FUNCTIONS:	THIS CONCEPT PROVIDES THE FUNCTIONS:
VISITOR CONTROL CENTER (VCC)	■
GUARD BOOTHS	
SEARCH BUILDING AREA	
COMMAND AND CONTROL	
ID CHECK AREA	
SEARCH AREA	
OVERWATCH	
TOILET	■
COMMUNICATIONS	■
MECHANICAL/ELECTRICAL	■
STORAGE	

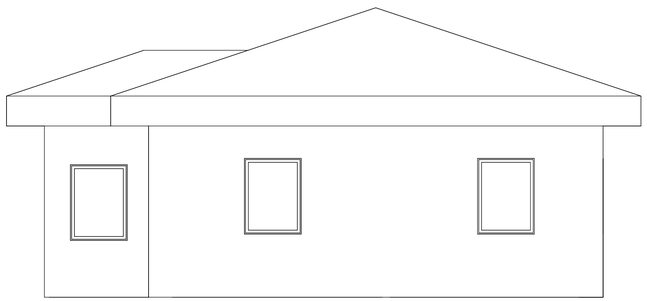
BUILDING/SITE FUNCTION NOTES:
1. COMBINING FUNCTIONS/BUILDINGS IS ACCEPTABLE.
2. SEE ACP STANDARD DESIGN 1.4.1/1.4.2 FOR ADDITIONAL INFORMATION.



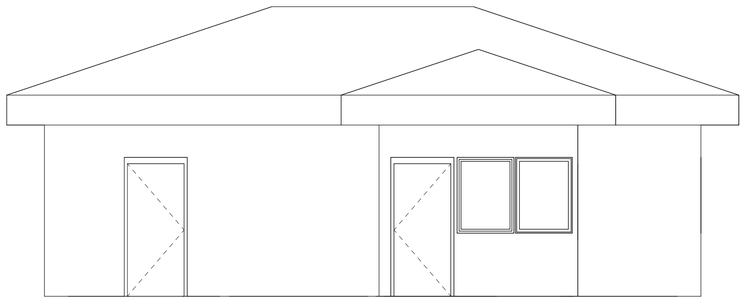
PLAN NORTH
WILL VARY BASED ON SITE

E1 CONCEPTUAL 2 PROCESSOR VISITOR CONTROL CENTER FLOOR PLAN
1/4" = 1'-0"

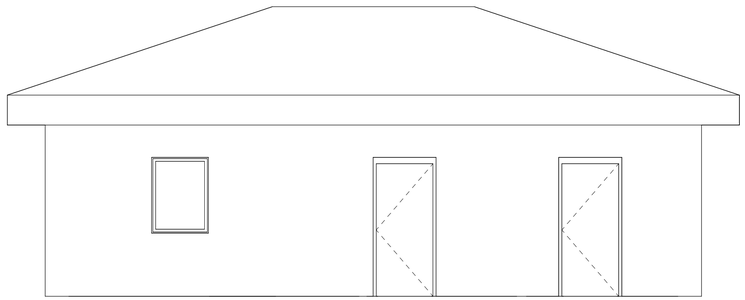
BUILDING GROSS SQUARE FOOTAGE: 890 SF



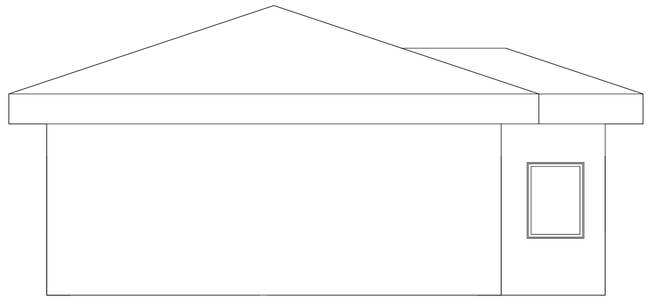
E11 NORTH ELEVATION
1/4" = 1'-0"



A1 EAST ELEVATION
1/4" = 1'-0"



A8 WEST ELEVATION
1/4" = 1'-0"



A15 SOUTH ELEVATION
1/4" = 1'-0"

0 2' 4' 8'

SCALE 1/4" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: E. MCCULLOUGH
DRAWN BY: E. MCCULLOUGH
CHECKED BY: B. CORUP
SUBMITTED BY:
ISSUE DATE: 9/23/24
SOLICITATION NO.:
CONTRACT NO.:
SIZE: ANSI D

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE. OMAHA, NE 68102

ACCESS CONTROL POINT (ACP) STANDARD DESIGN CONCEPTS

CONCEPTUAL 2 PROCESSOR VISITOR CONTROL CENTER LAYOUT

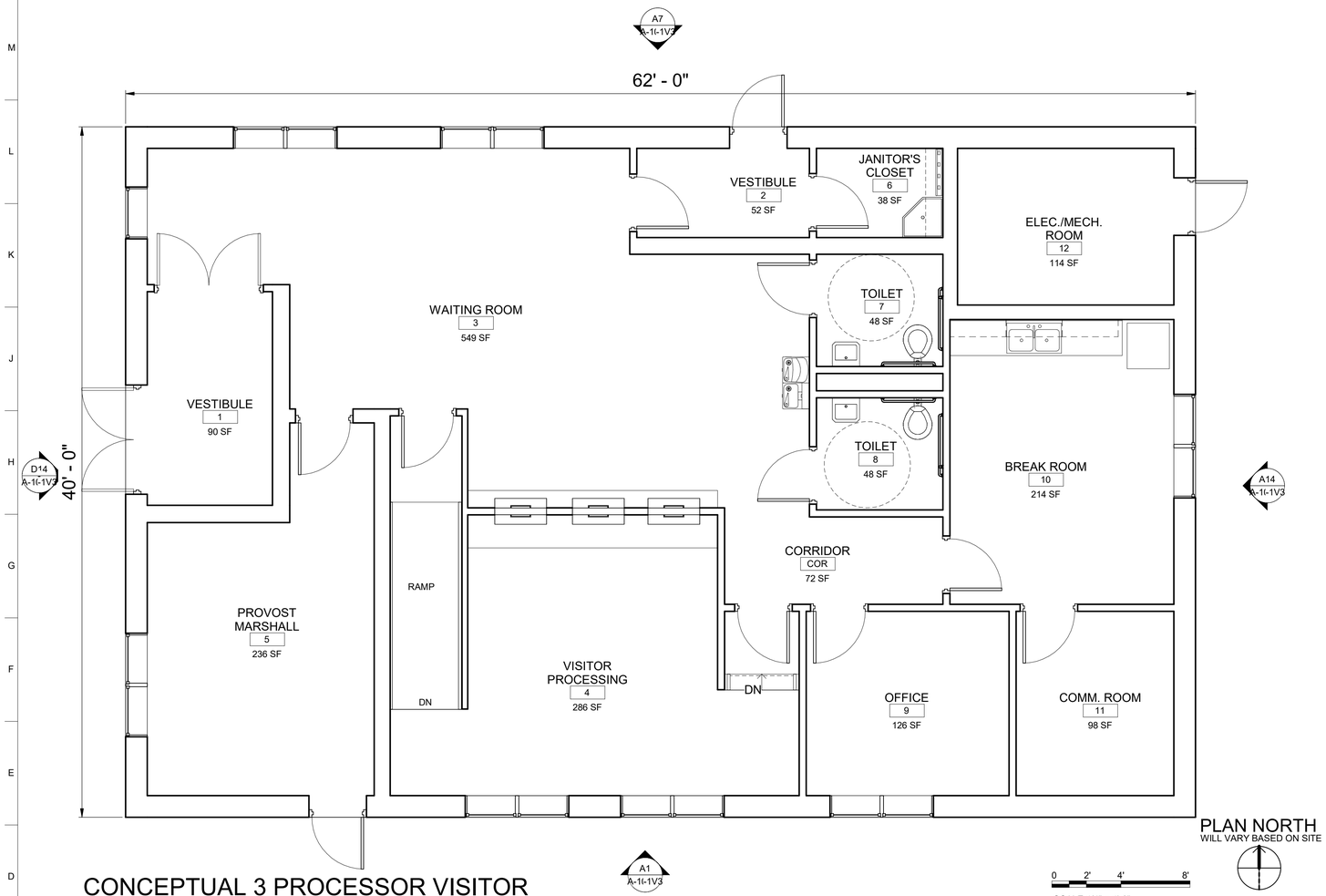
SHEET ID
A-101V2

GENERAL NOTES:
1. THIS CONCEPTUAL FLOOR PLAN REPRESENTS A FUNCTIONAL ARRANGEMENT, BUT IS NOT A REQUIRED LAYOUT.
2. ALL WALLS CAN BE ADJUSTED TO MEET THE NEEDS OF THE SPECIFIC INSTALLATION.
3. DIFFERENT ROOF DESIGNS ARE ALLOWED, COMPLY WITH UFC 3-110-03. LOW SLOPE ROOFING IS ACCEPTABLE, IF APPROVED BY THE INSTALLATION FACILITY STANDARDS.

FUNCTIONAL AREAS (WITH AREA SQUARE FOOTAGE (SF) AND NOTES):
1. VESTIBULES (NO LESS THAN 50 SF AND 90 SF)
2. WAITING ROOM (NO LESS THAN 400 SF)
2. VISITOR PROCESSING: (NO LESS THAN 200 SF)
3. LATRINES (NO LESS THAN 48 SF EACH, COMPLY WITH ARCHITECTURAL BARRIERS ACT)
4. PROVOST MARSHALL ROOM (NO LESS THAN 200 SF)
5. BREAK ROOM (NO LESS THAN 200 SF)
5. COMM ROOM (SEE UFC 3-580-01 FOR SF REQUIREMENTS. IN ADDITION, SIZE ACCORDING TO USER AND EQUIPMENT NEEDS.)
6. MECHANICAL/ELECTRICAL ROOM (SF IS BASED ON USER AND BUILDING REQUIREMENTS)
7. OFFICE ROOM (NO LESS THAN 100 SF)
8. JANITOR'S CLOSET (BASED ON USER NEEDS)
9. SEE ARMY STANDARD DESIGN FOR NURSING MOTHER'S ROOM REQUIREMENTS.

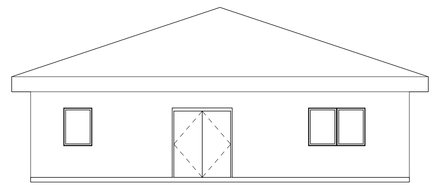
BUILDING/SITE FUNCTIONS:	THIS CONCEPT PROVIDES THE FUNCTIONS:
VISITOR CONTROL CENTER (VCC)	■
GUARD BOOTHS	
SEARCH BUILDING AREA	
COMMAND AND CONTROL	
ID CHECK AREA	
SEARCH AREA	
OVERWATCH	
LATRINE	■
COMMUNICATIONS	■
MECHANICAL/ELECTRICAL	■
STORAGE	

BUILDING/SITE FUNCTION NOTES:
1. COMBINING FUNCTIONS/BUILDINGS IS ACCEPTABLE.
2. SEE ACP STANDARD DESIGN 1.4.1/1.4.2 FOR ADDITIONAL INFORMATION.

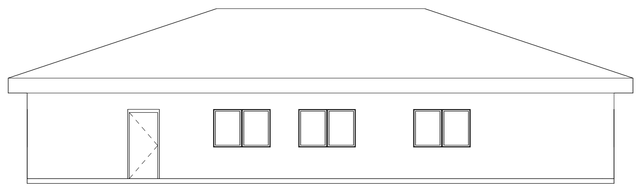


D1 CONCEPTUAL 3 PROCESSOR VISITOR CONTROL CENTER FLOOR PLAN
1/4" = 1'-0"

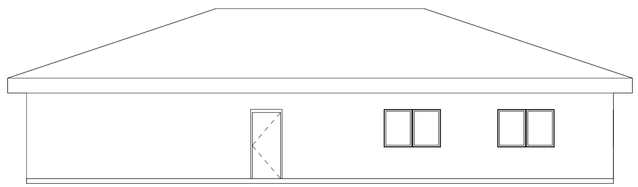
BUILDING GROSS SQUARE FOOTAGE: 2480 SF



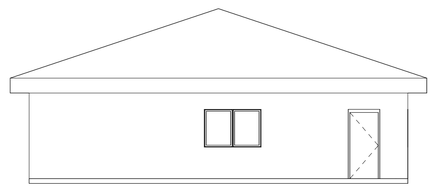
D14 WEST ELEVATION
1/8" = 1'-0"



A1 SOUTH ELEVATION
1/8" = 1'-0"



A7 NORTH ELEVATION
1/8" = 1'-0"



A14 EAST ELEVATION
1/8" = 1'-0"

0 4' 8' 16'
SCALE 1/8" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: E. MCCULLOUGH
DRAWN BY: E. MCCULLOUGH
CHECKED BY: B. CORLIP
SUBMITTED BY:
ISSUE DATE: 9/23/24
SOLICITATION NO.:
CONTRACT NO.:
SIZE: ANSI D

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE, OMAHA, NE 68102

ACCESS CONTROL POINT (ACP) STANDARD DESIGN CONCEPTS

CONCEPTUAL 3 PROCESSOR VISITOR CONTROL CENTER LAYOUT

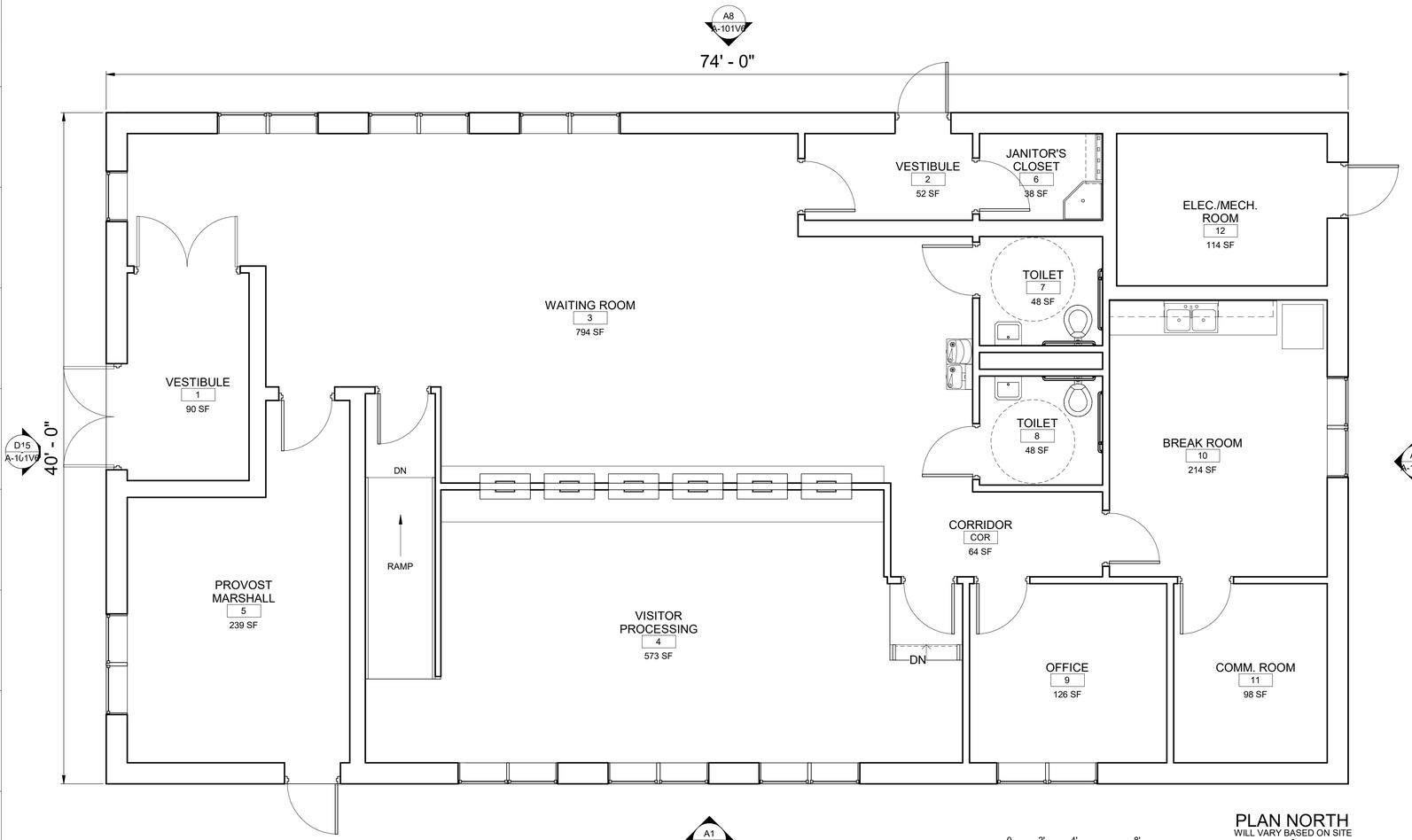
SHEET ID
A-101V3

GENERAL NOTES:
1. THIS CONCEPTUAL FLOOR PLAN REPRESENTS A FUNCTIONAL ARRANGEMENT, BUT IS NOT A REQUIRED LAYOUT.
2. ALL WALLS CAN BE ADJUSTED TO MEET THE NEEDS OF THE SPECIFIC INSTALLATION.
3. DIFFERENT ROOF DESIGNS ARE ALLOWED, COMPLY WITH UFC 3-110-03. LOW SLOPE ROOFING IS ACCEPTABLE, IF APPROVED BY THE INSTALLATION FACILITY STANDARDS.
4. MORE THAN 6 PROCESSORS MAY BE DESIGNED IF NEEDED BY INSTALLATION.

FUNCTIONAL AREAS (WITH AREA SQUARE FOOTAGE (SF) AND NOTES):
1. VESTIBULES (NO LESS THAN 50 SF AND 90 SF)
2. WAITING ROOM (NO LESS THAN 550 SF)
2. VISITOR PROCESSING: (NO LESS THAN 300 SF)
3. LATRINES (NO LESS THAN 48 SF EACH, COMPLY WITH ARCHITECTURAL BARRIERS ACT)
4. PROVOST MARSHALL ROOM (NO LESS THAN 200 SF)
5. BREAK ROOM (NO LESS THAN 200 SF)
5. COMM ROOM (SEE UFC 3-580-01 FOR SF REQUIREMENTS. IN ADDITION, SIZE ACCORDING TO USER AND EQUIPMET NEEDS.)
6. MECHANICAL/ELECTRICAL ROOM (SF IS BASED ON USER AND BUILDING REQUIREMENTS)
7. OFFICE ROOM (NO LESS THAN 100 SF)
8. JANITOR'S CLOSET (BASED ON USER NEEDS.)
8. SEE ARMY STANDARD DESIGN FOR NURSING MOTHER'S ROOM REQUIREMENTS.

BUILDING/SITE FUNCTIONS:	THIS CONCEPT PROVIDES THE FUNCTIONS:
VISITOR CONTROL CENTER (VCC)	■
GUARD BOOTHS	
SEARCH BUILDING AREA	
COMMAND AND CONTROL	
ID CHECK AREA	
SEARCH AREA	
OVERWATCH	
LATRINE	■
COMMUNICATIONS	■
MECHANICAL/ELECTRICAL	■
STORAGE	

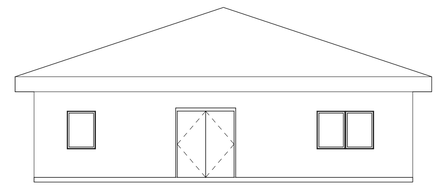
BUILDING/SITE FUNCTION NOTES:
1. COMBINING FUNCTIONS/BUILDINGS IS ACCEPTABLE.
2. SEE ACP STANDARD DESIGN 1.4.1/1.4.2 FOR ADDITIONAL INFORMATION.



D1 CONCEPTUAL 6 PROCESSOR VISITOR CONTROL CENTER FLOOR PLAN

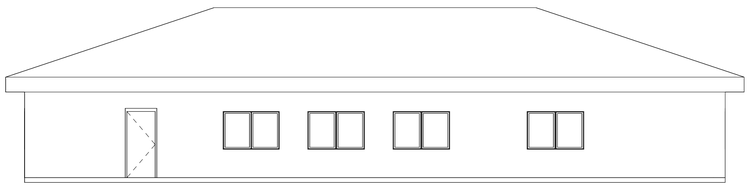
1/4" = 1'-0"

BUILDING GROSS SQUARE FOOTAGE: 2960 SF



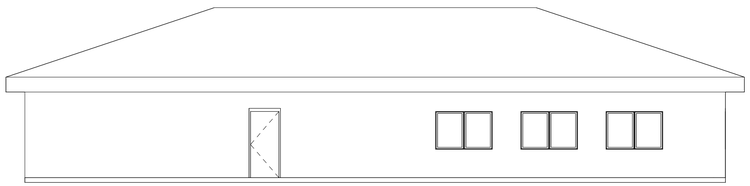
D15 WEST ELEVATION

1/8" = 1'-0"



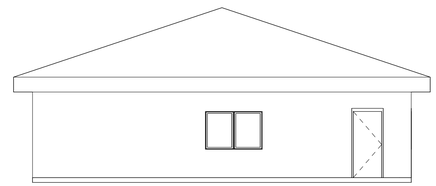
A1 SOUTH ELEVATION

1/8" = 1'-0"



A8 NORTH ELEVATION

1/8" = 1'-0"



A15 EAST ELEVATION

1/8" = 1'-0"

0 2' 4' 8'
SCALE 1/4" = 1'-0"

0 4' 8' 16'
SCALE 1/8" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

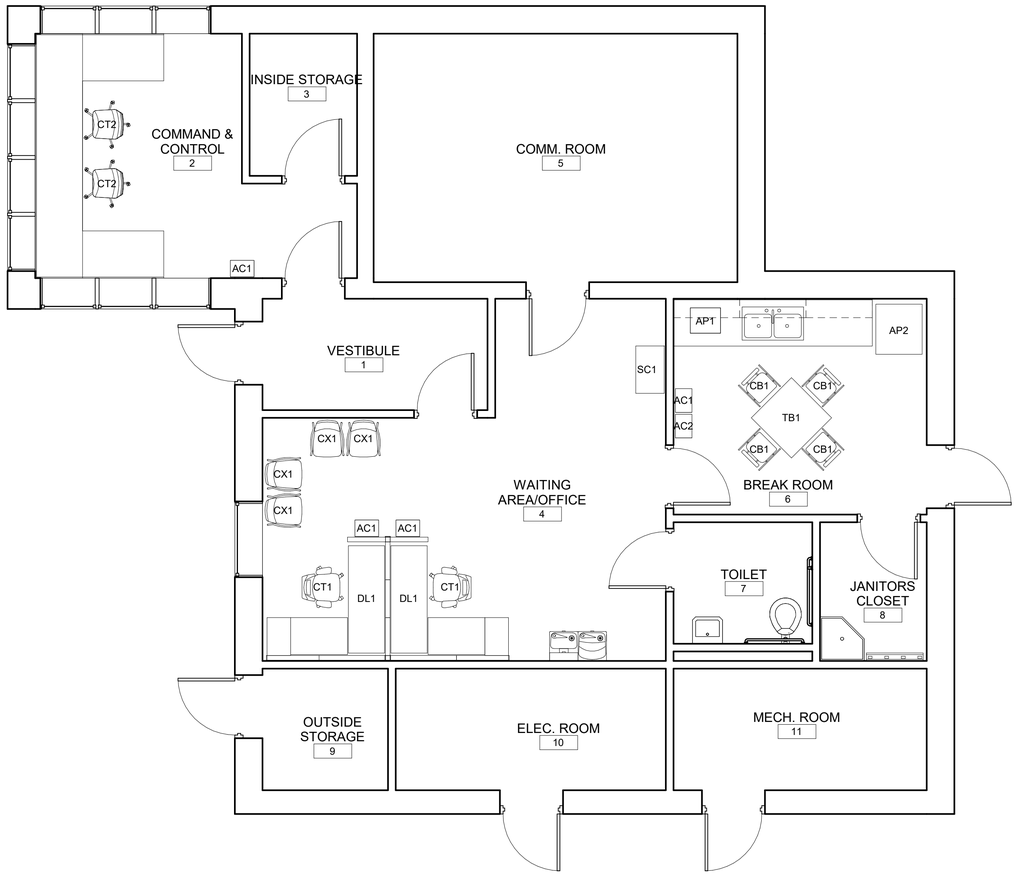
DESIGNED BY: E. MCCULLOUGH
DRAWN BY: E. MCCULLOUGH
CHECKED BY: B. GORUP
SUBMITTED BY:
ISSUE DATE: 9/23/24
SOLICITATION NO.:
CONTRACT NO.:
SIZE: ANSI D

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE, OMAHA, NE 68102

ACCESS CONTROL POINT (ACP) STANDARD DESIGN CONCEPTS

CONCEPTUAL 6 PROCESSOR VISITOR CONTROL CENTER LAYOUT

SHEET ID
A-101V6



F1 CONCEPTUAL COMMAND & CONTROL W/ SEARCH FURNITURE PLAN

1/4" = 1'-0"

FF&E SCHEDULE	
ITEM CODE	ITEM DESCRIPTION
AC1	TRASH RECEPTACLE
AC2	RECYCLE RECEPTACLE
AP1	MICROWAVE
AP2	REFRIGERATOR
CB1	BREAK CHAIR
CT1	TASK CHAIR
CT2	ARMLESS CHAIR
CX1	WAITING CHAIR
DL1	L SHAPED DESK
SC1	STORAGE CABINET
TB1	BREAK TABLE

NOTE:
1. FURNITURE N.I.C (NOT IN CONTRACT) AND FOR REFERENCE ONLY

PLAN NORTH
WILL VARY BASED ON SITE

0 2' 4' 8'

SCALE 1/4" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: C. GILBERT
DRAWN BY: C. GILBERT
CHECKED BY: B. CORLIP
SUBMITTED BY:
ISSUE DATE: 9/23/24
SOLICITATION NO.:
CONTRACT NO.:
SIZE: ANSI D

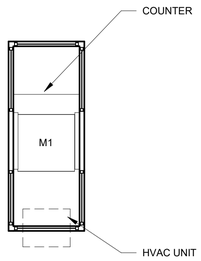
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE, OMAHA, NE 68102

ACCESS CONTROL POINT (ACP) STANDARD DESIGN CONCEPTS

FURNITURE FLOOR PLAN

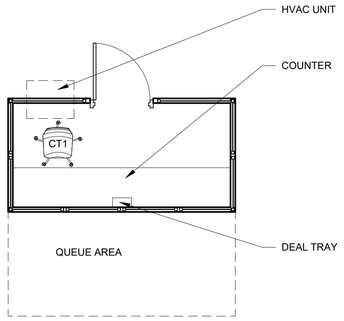
SHEET ID

I-101CS



K1 CONCEPTUAL GUARD BOOTH FURNITURE PLAN

1/4" = 1'-0"



K7 CONCEPTUAL PEDESTRIAN ID CHECK FURNITURE PLAN

1/4" = 1'-0"

FF&E SCHEDULE	
ITEM CODE	ITEM DESCRIPTION
CT1	ARMLESS CHAIR
M1	ANTI-FATIGUE MAT

NOTE:
1. FURNITURE N.I.C (NOT IN CONTRACT) AND FOR REFERENCE ONLY

PLAN NORTH
WILL VARY BASED ON SITE

0 2' 4' 8'

SCALE 1/4" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: C. GILBERT
DRAWN BY: C. GILBERT
CHECKED BY: B. CORLIP
SUBMITTED BY:
ISSUE DATE: 9/23/24
SOLICITATION NO.:
CONTRACT NO.:
SIZE: ANSI D

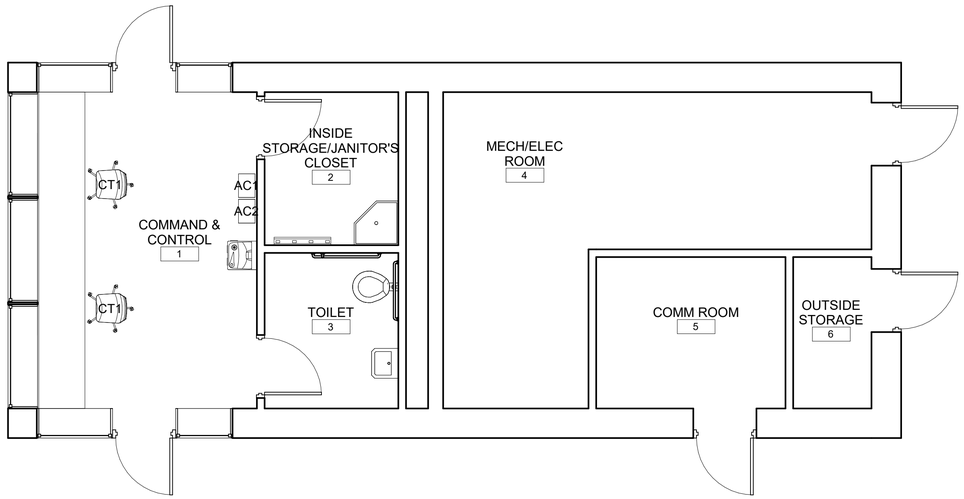
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE, OMAHA, NE 68102

ACCESS CONTROL POINT (ACP) STANDARD DESIGN CONCEPTS

CONCEPTUAL GUARD BOOTH AND PEDESTRIAN ID CHECK FURNITURE PLAN

SHEET ID

I-101GB



CONCEPTUAL GATEHOUSE FURNITURE PLAN

J1

1/4" = 1'-0"

FF&E SCHEDULE	
ITEM CODE	ITEM DESCRIPTION
AC1	TRASH RECEPTACLE
AC2	RECYCLE RECEPTACLE
CT1	ARMLESS CHAIR

NOTE:
1. FURNITURE N.I.C (NOT IN CONTRACT) AND FOR REFERENCE ONLY

PLAN NORTH
WILL VARY BASED ON SITE

0 2' 4' 8'

SCALE 1/4" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: C. GILBERT
DRAWN BY: C. GILBERT
CHECKED BY: B. CORLIP
SUBMITTED BY:
ISSUE DATE: 9/23/24
SOLICITATION NO.:
CONTRACT NO.:
SIZE: ANSI D

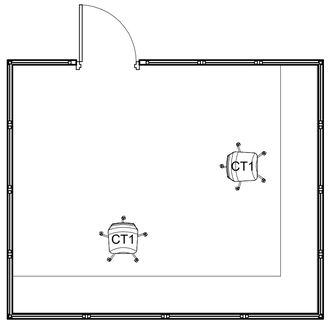
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE, OMAHA, NE 68102

ACCESS CONTROL POINT (ACP) STANDARD DESIGN CONCEPTS

FURNITURE FLOOR PLAN

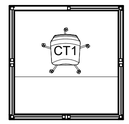
SHEET ID

I-101GH



K1 CONCEPTUAL OVERWATCH W/ COMMAND & CONTROL FURNITURE PLAN

1/4" = 1'-0"



K7 CONCEPTUAL OVERWATCH FURNITURE PLAN

1/4" = 1'-0"

FF&E SCHEDULE	
ITEM CODE	ITEM DESCRIPTION
CT1	ARMLESS CHAIR

NOTE:
1. FURNITURE IS N.I.C (NOT IN CONTRACT) AND FOR REFERENCE ONLY.

PLAN NORTH
WILL VARY BASED ON SITE

0 2' 4' 8'

SCALE 1/4" = 1'-0"

US Army Corps of Engineers ®

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SIZE: ANSI D

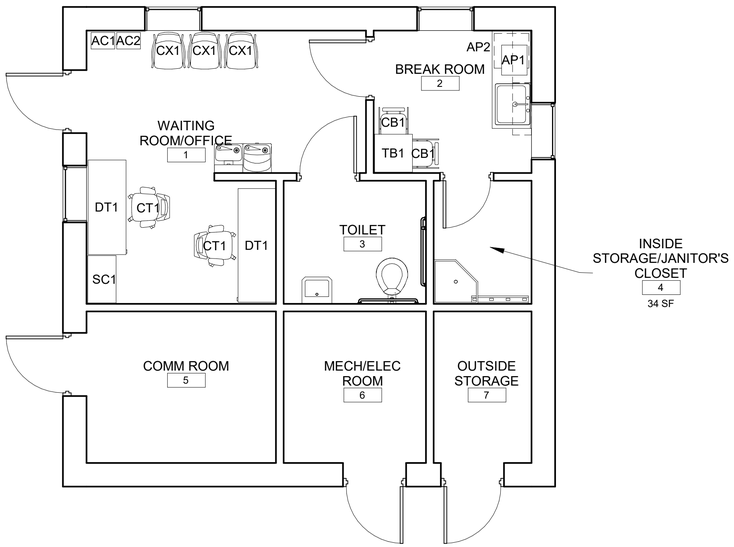
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE, OMAHA, NE 68102

ACCESS CONTROL POINT (ACP) STANDARD DESIGN CONCEPTS

FURNITURE FLOOR PLAN

SHEET ID

I-101O



CONCEPTUAL SMALL SEARCH AREA BUILDING FURNITURE PLAN

J1

1/4" = 1'-0"

FF&E SCHEDULE	
ITEM CODE	ITEM DESCRIPTION
AC1	TRASH RECEPTACLE
AC2	RECYCLE RECEPTACLE
AP1	MICROWAVE
AP2	UNDER COUNTER REF.
CB1	BREAK ROOM CHAIR
CT1	TASK CHAIR
CX1	WAITING CHAIR
DT1	DESK
SC1	STORAGE CABINET
TB1	BREAK ROOM TABLE

NOTE:
1. FURNITURE N.I.C (NOT IN CONTRACT) AND FOR REFERENCE ONLY.

PLAN NORTH
WILL VARY BASED ON SITE

0 2' 4' 8'

SCALE 1/4" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: C. GILBERT
DRAWN BY: C. GILBERT
CHECKED BY: B. CORLIP
SUBMITTED BY:
ISSUE DATE: 9/23/24
SOLICITATION NO.:
CONTRACT NO.:
SIZE: ANSI D

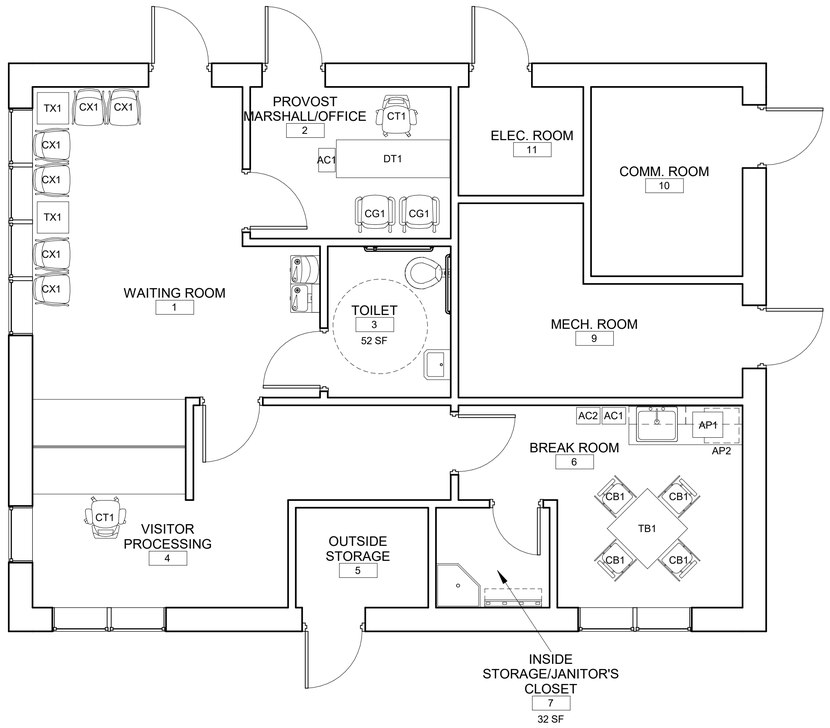
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE, OMAHA, NE 68102

ACCESS CONTROL POINT (ACP) STANDARD DESIGN CONCEPTS

FURNITURE FLOOR PLAN

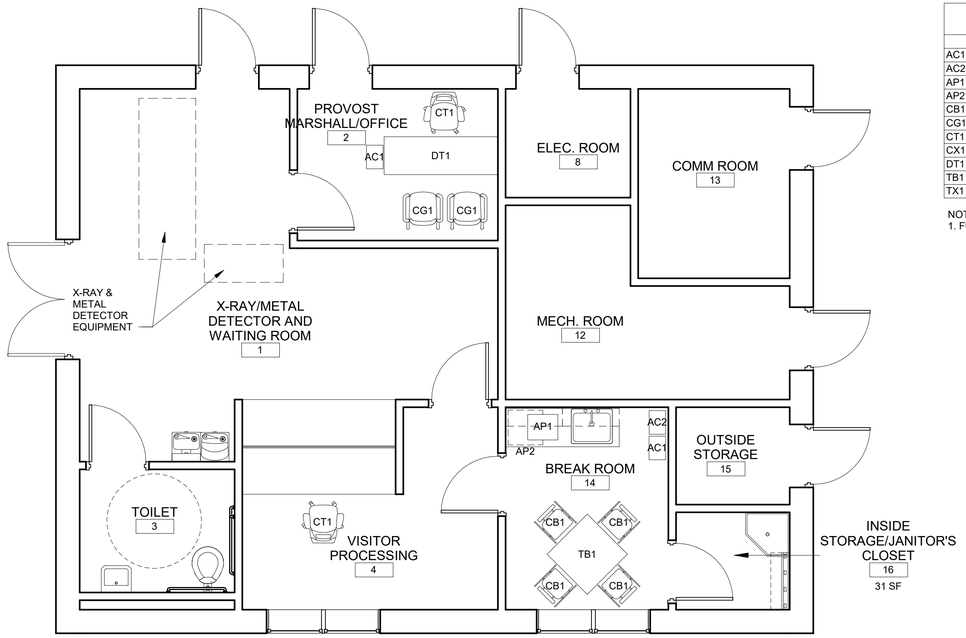
SHEET ID

I-101S1



CONCEPTUAL LARGE SEARCH AREA BUILDING FURNITURE PLAN

G1 1/4" = 1'-0"



ALT CONCEPTUAL LARGE SEARCH AREA BUILDING FURNITURE PLAN

G8 1/4" = 1'-0"

FF&E SCHEDULE	
ITEM CODE	ITEM DESCRIPTION
AC1	TRASH RECEPTACLE
AC2	RECYCLE RECEPTACLE
AP1	MICROWAVE
AP2	UNDER COUNTER REF.
CB1	BREAK CHAIR
CG1	GUEST CHAIR
CT1	TASK CHAIR
CX1	WAITING CHAIR
DT1	DESK
TB1	BREAK TABLE
TX1	END TABLE

NOTE:
1. FURNITURE N.I.C (NOT IN CONTRACT) AND FOR REFERENCE ONLY.

PLAN NORTH
WILL VARY BASED ON SITE

0 2' 4' 8'

SCALE 1/4" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: C. GILBERT
DRAWN BY: C. GILBERT
CHECKED BY: B. CORLIP
SUBMITTED BY:
ISSUE DATE: 9/23/24
SOLICITATION NO.:
CONTRACT NO.:
SIZE: ANSI D

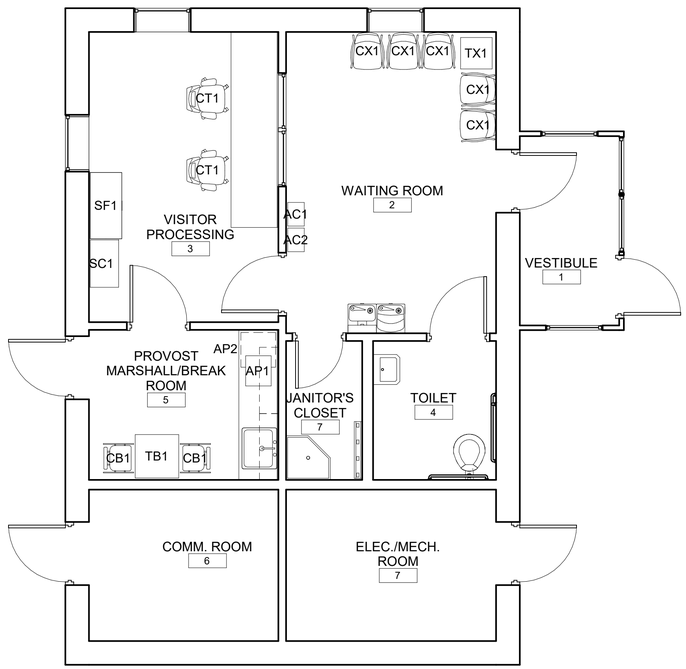
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE, OMAHA, NE 68102

ACCESS CONTROL POINT (ACP) STANDARD DESIGN CONCEPTS

FURNITURE PLAN

SHEET ID

I-101S2



CONCEPTUAL 2 PROCESSOR VISITOR CONTROL CENTER FURNITURE PLAN

H1

1/4" = 1'-0"

FF&E SCHEDULE	
ITEM CODE	ITEM DESCRIPTION
AC1	TRASH RECEPTACLE
AC2	RECYCLE RECEPTACLE
AP1	MICROWAVE
AP2	UNDER COUNTER REF.
CB1	BREAK CHAIR
CT1	TASK CHAIR
CX1	WAITING CHAIR
SC1	STORAGE CABINET
SF1	LATERAL FILE
TB1	BREAK ROOM TABLE
TX1	END TABLE

NOTE:
1. FURNITURE N.I.C (NOT IN CONTRACT) AND FOR REFERENCE ONLY.

PLAN NORTH
WILL VARY BASED ON SITE

0 2' 4' 8'

SCALE 1/4" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: C. GILBERT
DRAWN BY: C. GILBERT
CHECKED BY: B. CORLIP
SUBMITTED BY:
ISSUE DATE: 9/23/24
SOLICITATION NO.:
CONTRACT NO.:
SIZE: ANSI D

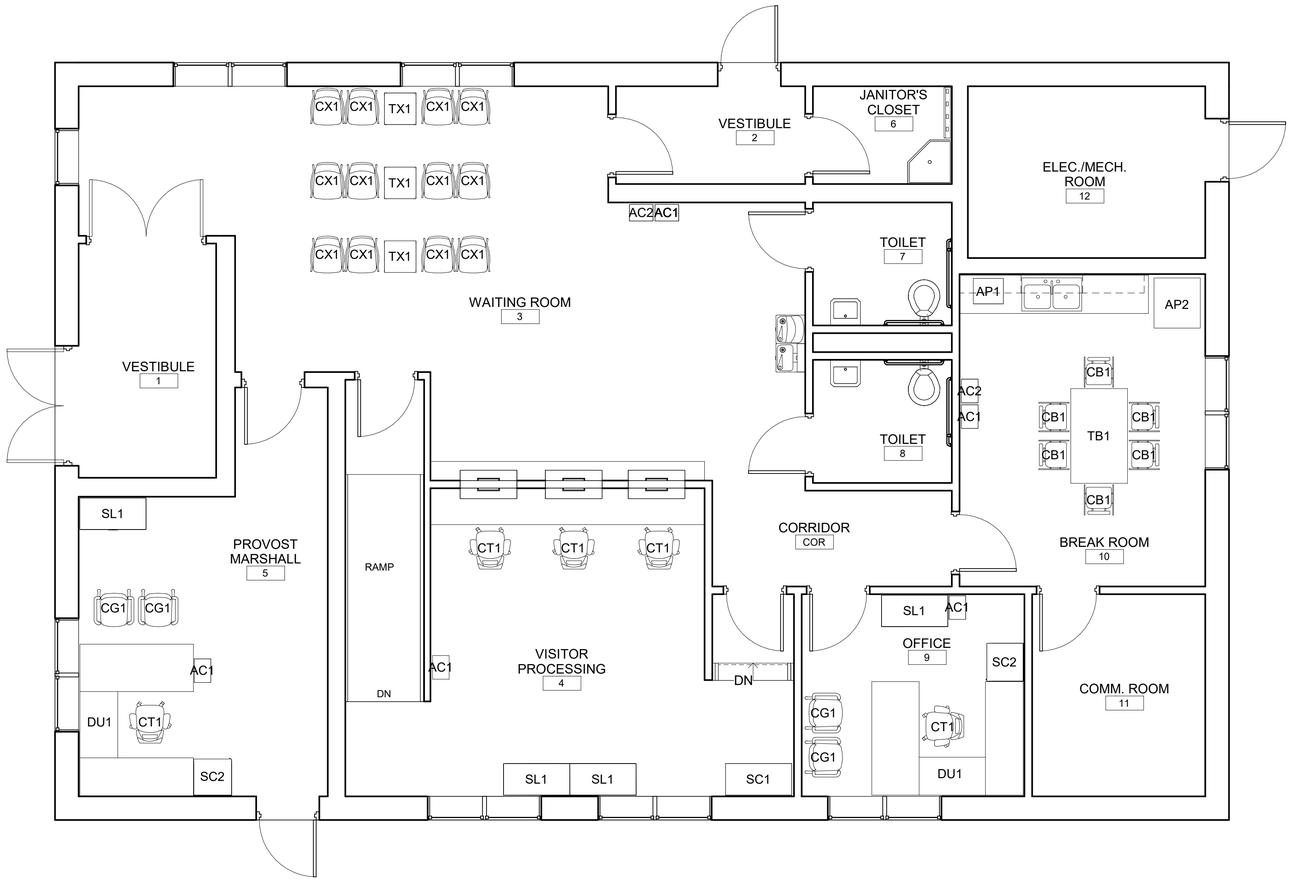
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE, OMAHA, NE 68102

ACCESS CONTROL POINT (ACP) STANDARD DESIGN CONCEPTS

FURNITURE FLOOR PLAN

SHEET ID

I-101V2



CONCEPTUAL 3 PROCESSOR VISITOR CONTROL CENTER FURNITURE PLAN

F1

1/4" = 1'-0"

FF&E SCHEDULE	
ITEM CODE	ITEM DESCRIPTION
AC1	TRASH RECEPTACLE
AC2	RECYCLE RECEPTACLE
AP1	MICROWAVE
AP2	REFRIGERATOR
CB1	BREAK CHAIR
CG1	GUEST CHAIR
CT1	TASK CHAIR
CX1	WAITING CHAIR
DU1	U-SHAPED DESK
SC1	STORAGE CABINET
SC2	WARDROBE STORAGE TOWER
SL1	LATERAL FILE
TB1	BREAK TABLE
TX1	END TABLE

NOTE:
1. FURNITURE N.I.C (NOT IN CONTRACT) AND FOR REFERENCE ONLY

PLAN NORTH
WILL VARY BASED ON SITE

0 2' 4' 8'

SCALE 1/4" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: C. GILBERT
DRAWN BY: C. GILBERT
CHECKED BY: B. CORLIP
SUBMITTED BY:
ISSUE DATE: 9/23/24
SOLICITATION NO.:
CONTRACT NO.:
SIZE: ANSI D

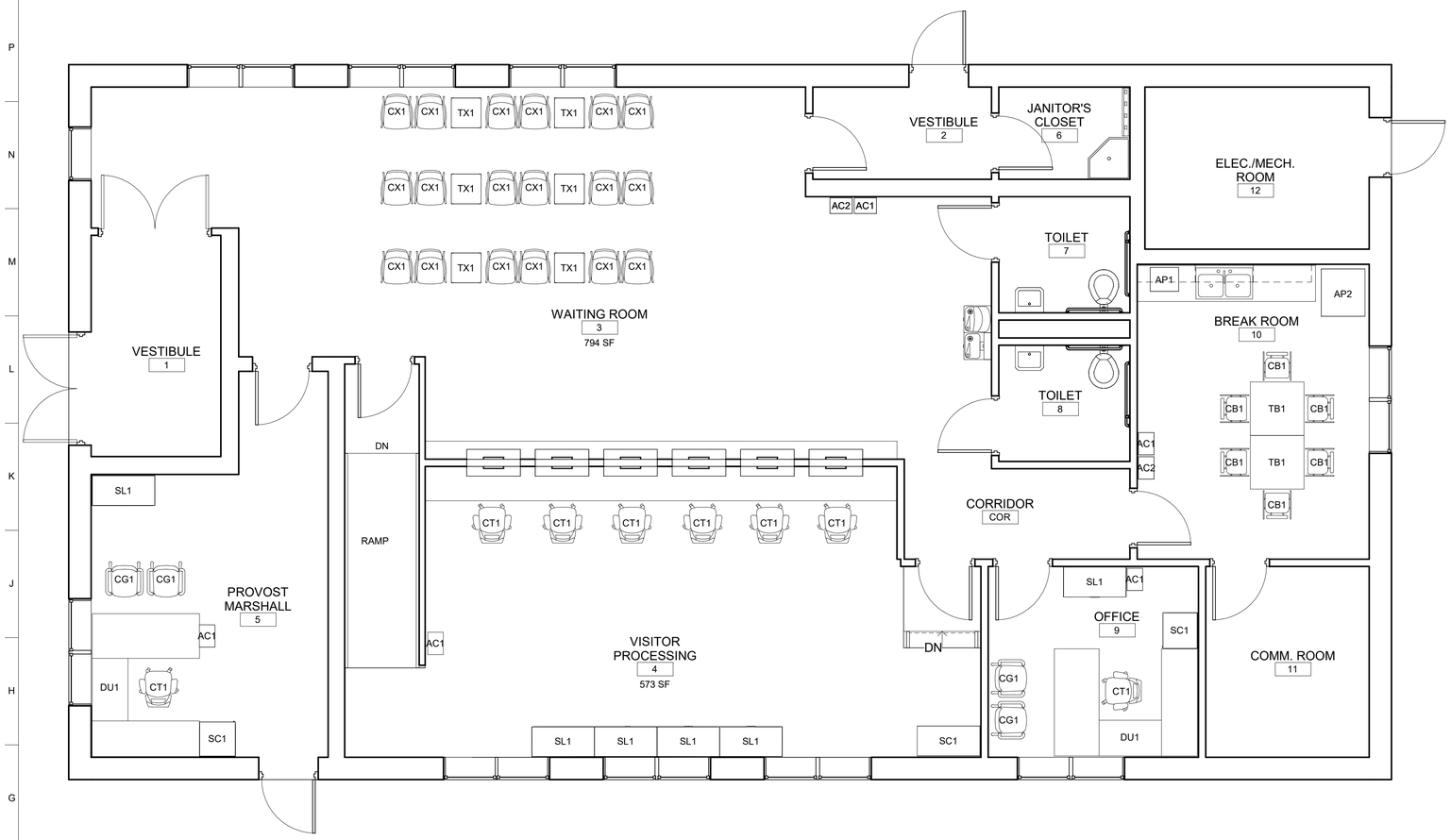
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE, OMAHA, NE 68102

ACCESS CONTROL POINT (ACP) STANDARD DESIGN CONCEPTS

FURNITURE FLOOR PLAN

SHEET ID

I-101V3



FF&E SCHEDULE	
ITEM CODE	ITEM DESCRIPTION
AC1	TRASH RECEPTACLE
AC2	RECYCLE RECEPTACLE
AP1	MICROWAVE
AP2	REFRIGERATOR
CB1	BREAK CHAIR
CG1	GUEST CHAIR
CT1	TASK CHAIR
CX1	WAITING CHAIR
DU1	U-SHAPED DESK
SC1	STORAGE CABINET
SL1	LATERAL FILE
TB1	BREAK TABLE
TX1	END TABLE

NOTE:
1. FURNITURE N.I.C (NOT IN CONTRACT) AND FOR REFERENCE ONLY.

CONCEPTUAL 6 PROCESSOR VISITOR CONTROL CENTER FURNITURE PLAN

F1

1/4" = 1'-0"

PLAN NORTH
WILL VARY BASED ON SITE

0 2' 4' 8'

SCALE 1/4" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: C. GILBERT
DRAWN BY: C. GILBERT
CHECKED BY: B. CORLIP
SUBMITTED BY:
ISSUE DATE: 9/23/24
SOLICITATION NO.:
CONTRACT NO.:
SIZE: ANSI D

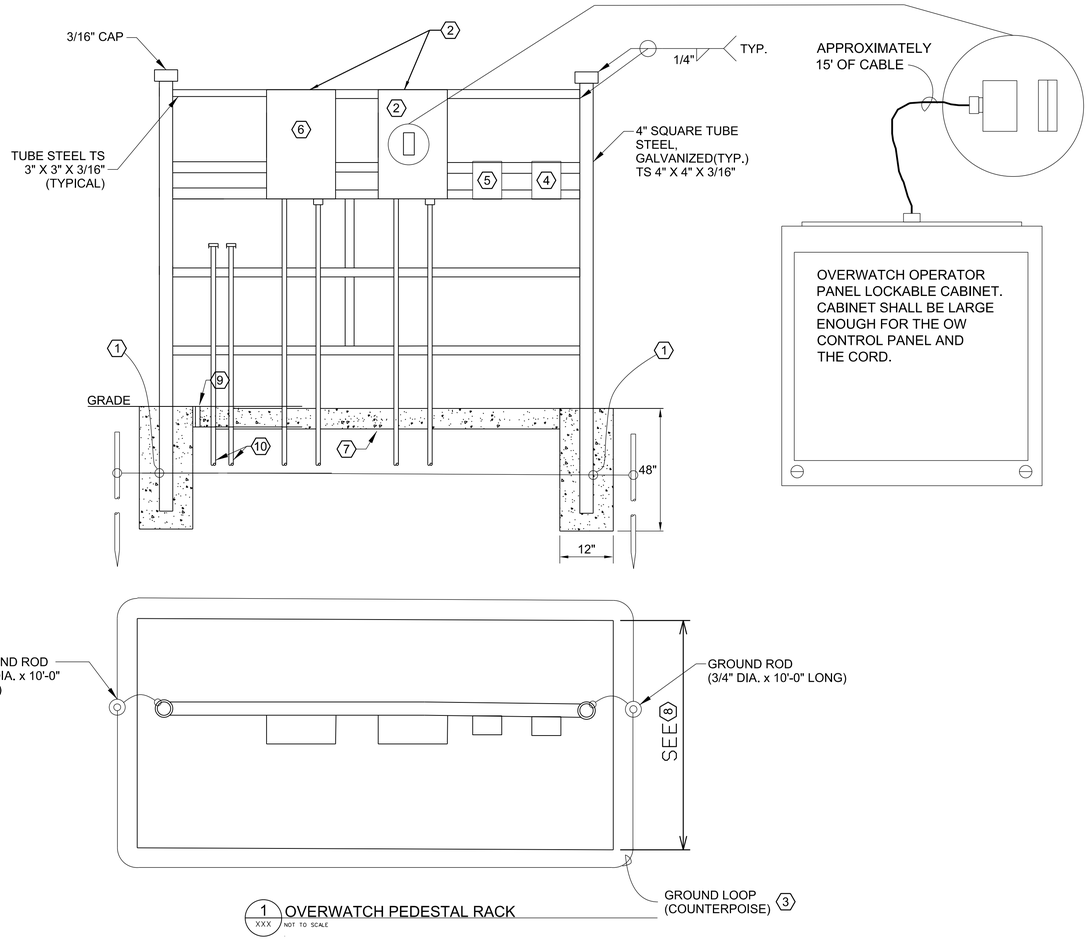
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE, OMAHA, NE 68102

ACCESS CONTROL POINT (ACP) STANDARD DESIGN CONCEPTS

FURNITURE FLOOR PLAN

SHEET ID

I-101V6



1 XXX OVERWATCH PEDESTAL RACK
NOT TO SCALE

GENERAL NOTES:
1. CONTRACTOR TO SIZE SUPPORT MEMBERS TO SUPPORT ACTUAL EQUIPMENT USED.

2. ALL ABOVE GROUND CONDUIT SHALL BE RGS AND SHALL TRANSITION TO PVC BELOW GRADE.

3. THIS IS A TYPICAL DETAIL THAT CAN BE USED WHEN THE OVERWATCH POSITION IS A PAD. THE MAIN ELEMENT IS THE OVERWATCH AVB PANEL IS TO HAVE CORD WITH A PLUG CONNECTION AND A LOCKABLE ENCLOSURE THAT ENSURE THE PANEL CAN BE STORED ON SITE.

KEYED NOTES
1. #6 AWG BARE COPPER BOLTED TO FRAME AND EXOTHERMICALLY CONNECTED TO 3/4" DIA. x 10'-0" LONG GROUND ROD.

2. SPACE FOR ACTIVE VEHICLE BARRIER OVERWATCH CONTROL PANEL. PROVIDE TAMPER SWITCHES PER SPECIFICATIONS.

3. EXOTHERMICALLY CONNECT GROUND RODS TO EACH OTHER WITH BARE COPPER. CONDUCTOR SIZE SHALL BE 1/0 AWG.

4. WEATHERPROOF GFCI CONVENIENCE RECEPTACLE.

5. WEATHERPROOF JUNCTION BOX (4"X4") FOR DURESS PUSHBUTTON.

6. DIRECT LINE TELEPHONE. INSTALL TELEPHONE JACK IN NEMA 3R OR 4 CAST ALUMIMUM HEAVY DUTY PHONE ENCLOSURE. APPROXIMATE BOX DIMENSIONS ARE 20"H x 10"W x 7"D. BOX SHALL BE YELLOW WITH THE WORDS 'TELEPHONE' ON THE OUTSIDE HINGED DOOR.

7. SIX INCH CONCRETE PAD WITH WIRE MESH.

8. ENSURE PAD WIDTH PROVIDES 3-FOOT CLEAR FROM THE EQUIPMENT AS A MINIMUM. CONTRACTOR CAN MOUNT EQUIPMENT ON BACK OF RACK TO REDUCE OVERALL LENGTH.

9. 3/4" PVC THROUGH CONCRETE SLAB. SEAL CONDUIT WITH PUTTY LIKE SEALANT.

10. EXTEND ONE 2"C TO HH-14C AND ONE 2"C TO HH-14P. CAP AND SEAL THE CONDUIT AT BOTH ENDS.

STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGEMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS.

US Army Corps of Engineers
OMAHA DISTRICT

MARK	DESCRIPTION	DATE	APPR.

MARK	DESCRIPTION	DATE	APPR.

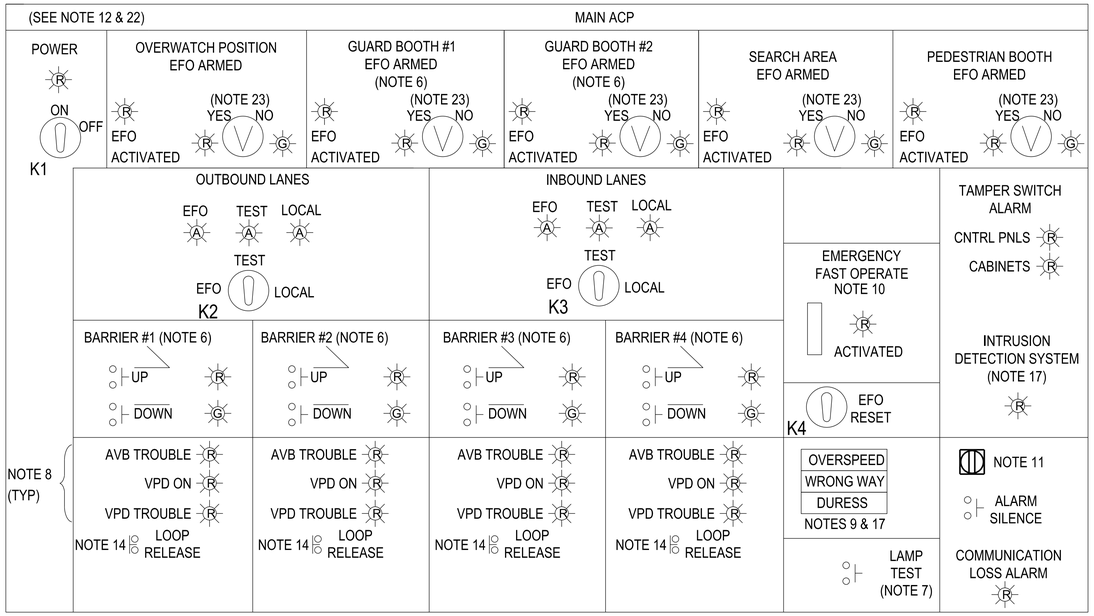
DESIGNED BY: MARK T. McNAMARA, PE
DRWN BY: S.A.S.
CKD BY: M.T.M.,PE
SUBMITTED BY: STEVEN LOTT, PE
DATE: FEBRUARY 2021
SOLICITATION NO.: N
CONTRACT NO.: N
FILE NUMBER: N
PLOT DATE:
PLOT SCALE:
SIZE:
FILE NAME:

US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

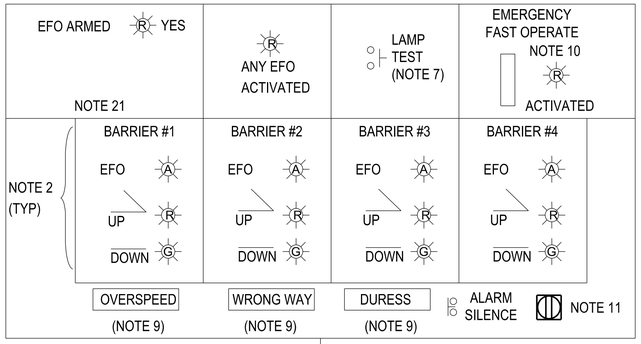
OVERWATCH AVB OPERTING PANEL PEDESTAL DETAIL

SHEET IDENTIFICATION
E-100O
00



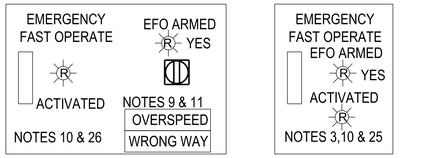
COMMAND & CONTROL MASTER CONTROL OPERATING PANEL

HYBRID BEACON (SIGNS AND SIGNALS)
SAFETY SYSTEM
NOT TO SCALE



OVERWATCH POSITION CONTROL OPERATING PANEL

HYBRID BEACON (SIGNS AND SIGNALS)
SAFETY SYSTEM
NOT TO SCALE



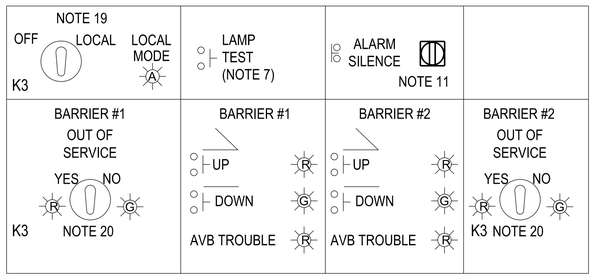
SEARCH AREA(S) & MAIN GUARD BOOTH OPERATING PANEL

NOT TO SCALE

GUARD BOOTH EFO CONTROL BUTTON OPERATING PANEL BY DOOR

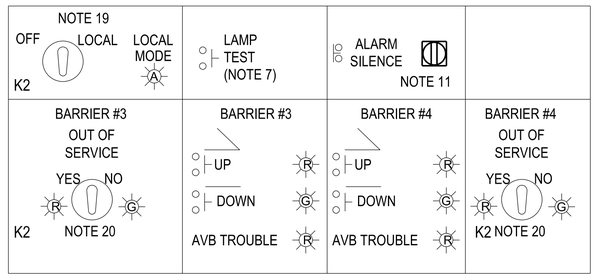
NOT TO SCALE

HYBRID BEACON (SIGNS AND SIGNALS)
SAFETY SYSTEM
NOT TO SCALE



LOCAL CONTROL PANEL AT INBOUND BARRIER

HYBRID BEACON (SIGNS AND SIGNALS) SAFETY SYSTEM
NOT TO SCALE



LOCAL CONTROL PANEL AT OUTBOUND BARRIER

HYBRID BEACON (SIGNS AND SIGNALS) SAFETY SYSTEM
NOT TO SCALE

NOTES:

1. THE CONTROL PANEL LAYOUTS DEPICT AN ACCESS CONTROL POINT (ACP) WITH A GATEHOUSE, 2 GUARD BOOTHS, A SEARCH AREA, PEDESTRIAN BOOTH, AN OVER WATCH POSITION, AND 4 ACTIVE VEHICLE BARRIERS (AVB). THE BARRIER LAYOUTS ARE NOTIONAL SINCE IT WILL VARY WITH EACH ACP AND AVB SYSTEM.

2. BARRIER MODE AND STATUS INDICATING LIGHTS ARE OPTIONAL. PROVIDE AT REQUEST OF THE INSTALLATION. IF THE OVERWATCH IS A PARKING POSITION, IT IS RECOMMENDED TO NOT PROVIDE.

3. PROVIDE A SEPARATE STAND ALONE EFO TOGGLE SWITCH OR RED PUSH BUTTON WITH SAFETY COVER MOUNTED ON THE INSIDE OF THE GUARD BOOTH TO THE LEFT OF THE DOOR FRAME FOR EASY ACCESS BY THE GUARD WHO MAY BE STANDING OUTSIDE GUARD BOOTH DURING ID CHECKS.

4. BARRIER MODE SELECTOR SWITCHES SHALL BE KEY OPERATED:

   a. UNDER NORMAL OPERATIONS,THE BARRIER MODE SELECTOR SWITCHES WILL BE IN THEIR EFO POSITIONS WITH KEYS REMOVED AND STORED IN A LOCKED CABINET IN THE GATEHOUSE ACCESSIBLE ONLY BY THE CHIEF OF THE GUARDS.
   b. WHEN PERFORMING BARRIER MAINTENANCE, MAINTENANCE PERSONNEL WILL OBTAIN THE KEY FROM THE CHIEF OF THE GUARDS, PLACE THE SWITCH IN THE "LOCAL" POSITION, AND THEN REMOVE AND RETAIN THE KEY. THE MAINTENANCE PERSON WILL THEN PUT THE KEY IN THE MODE SELECTOR SWITCH ON THE BARRIERS LOCAL CONTROL PANEL LOCATED AT THE BARRIER AND TURN THE KEY TO THE "LOCAL" POSITION TO ACTIVATE THE OPEN AND CLOSE SWITCHES ON THE LOCAL CONTROL PANEL. WHEN MAINTENANCE IS COMPLETE, THE MAINTENANCE PERSON WILL PLACE THE MODE SELECTOR SWITCH ON THE LOCAL CONTROL PANEL BACK TO "OFF" MODE, REMOVE THE KEY, AND RETURN THE KEY TO THE CHIEF OF THE GUARDS.THE CHIEF OF THE GUARDS WILL USE THE KEY TO PLACE THE BARRIER'S MODE SELECTOR SWITCH ON THE MASTER CONTROL PANEL IN THE "EFO" POSITION, AND THEN WILL REMOVE AND LOCKUP THE KEY.
   c. A GUARD MAY TEST OPERATE A BARRIER BY FIRST OBTAINING THE BARRIER'S MODE SWITCH KEY FROM THE CHIEF OF THE GUARDS, PLACING THE MODE SWITCH IN THE "TEST" POSITION, AND THEN OPENING OR CLOSING THE BARRIER WITH THE PUSHBUTTONS ON THE MASTER CONTROL PANEL. UPON COMPLETION OF THE TEST OPERATIONS, THE GUARD WILL RETURN MODE TO "EFO", REMOVE THE KEY, AND RETURN IT TO THE CHIEF OF THE GUARDS. PROCEDURES MUST BE IN PLACE TO ENSURE ALL OPERABLE BARRIERS' MODE SELECTOR SWITCHES ARE PLACED IN THE EFO POSITIONS FOR THE PROPER RESPONSE TO AN EFO COMMAND.

5. SEE UFGS 34 71 13.19 "CRASH RATED ACTIVE VEHICLE BARRIERS AND CONTROLS" APPENDIX A "HYBRID BEACON SAFETY SYSTEM" FOR DESCRIPTIONS OF THE REQUIRED BARRIER AND TRAFFIC CONTROL SEQUENCES. THE HYBRID BEACON SAFETY SCHEME INDICATED IS BASED ON SDDCTEA PAMPHLET 55-15, 2019.

6. LABEL FOR BARRIER AND GUARD BOOTH DESCRIPTION SHALL USE VERBAGE TO HELP DESCRIBE THE LOCATION SUCH AS EAST AND WEST OR INSIDE & OUTSIDE.

7. LAMP TEST PUSH BUTTON SHALL TURN ON ALL INDICATING LIGHTS WHILE BUTTON IS PUSHED WITHOUT EFFECTING ANY CONTROLS.

NOTES CONTINUED:

8. THE INDICATING LIGHT LABELED 'AVB TROUBLE' SHALL COME ON FOR ANY PROBLEMS OR ALARM CONDITIONS AT THE BARRIER, e.g. LOW OIL AIR PRESSURE, LOW VOLTAGE, ETC. THE INDICATING LIGHT LABELED 'VPD ON' SHALL COME ON WHEN ANY OF THE BARRIER'S VEHICLE PRESENCE DETECTORS (VPD'S) GETS A CALL (VEHICLE DETECTED) FOR MORE THAN 15 SECONDS. THE VPD TROUBLE SHALL COME ON WHEN THERE IS A PROBLEM DETECTED ON THE VEHICLE PRESENCE DETECTORS OR CONTROLLER.

9. OVERSPEED, WRONG-WAY, AND DURESS ALARMS AND CAN EITHER BE BACK LIT WINDOWS OR RED INDICATING LIGHTS. PROVIDE AN ADJUSTABLE AUDIBLE ALARM. ALARMS. DURESS ALARMS SHALL BE ON OVERWATCH POSITION PANEL AND COMMAND & CONTROL MASTER CONTROL PANEL ONLY. SILENCE SWITCH CAN BE USED TO SILENCE AUDIBLE ALARMS. ALL OVERSPEED AND WRONG WAY ALARMS SHALL BE SELF CLEARING. DURESS ALARM DOES NOT NEED TO BE MONITORED AT THE MASTER CONTROL PANEL IF DONE BY ANOTHER PANEL IN THE COMMAND & CONTROL AREA.

10. AREA AROUND EFO SWITCH SHALL BE RED.

11. AUDIBLE ALARM, ALARM SHALL HAVE A MEANS TO ADJUST THE VOLUME.

12. PANEL ORIENTATION AND LABELING SHALL MATCH THE WAY THE GUARD VIEWS THE BARRIERS AND GUARD BOOTHS.

13. CONTROLS SHALL BE MADE SO THAT IF AN ACTIVE VEHICLE BARRIER (AVB) IS IN TEST OR LOCAL MODE AND AN EFO IS PUSHED THEN TURNING THE THREE POSITION SWITCH TO EFO PRIOR TO AN EFO RESET SHALL NOT CAUSE THE AVB TO DEPLOY.

14. LOOP SAFETY. WHEN THE PRESENCE DETECTION LOOPS IN FRONT OF AND BEHIND THE BARRIER ARE MORE THAN 10 FEET APART, A SAFETY CIRCUIT MUST BE ADDED TO ENSURE THAT THE BARRIER WILL NOT CLOSE (DEPLOY) ON A VEHICLE THAT IS OVER THE BARRIER BUT BETWEEN THE LOOPS SO IS NOT DETECTED BY EITHER LOOP. THE FOLLOWING ARE APPROVED CIRCUITS:

   a. LATCHING CIRCUIT. WHEN A VEHICLE IS DETECTED BY LOOP 1, THE CONTROL LOGIC PICKS-UP AND SEALS ITSELF IN. AFTER THE VEHICLE PASSES OVER THE BARRIER IT SHOULD BE DETECTED BY LOOP 2 WHICH WILL DROP OUT RELAY FROM LOOP 1. LOOP RELEASE PUSHBUTTON IS REQUIRED TO DROPOUT RELAY LOOP 1 RELAY IN THE EVENT A VEHICLE IS DETECTED BY LOOP 1 BUT IS NOT DETECTED BY LOOP 2. IF THE VEHICLE PASSES OVER THE BARRIER BUT IS NOT DETECTED BY LOOP 2, THE LOOP 1 RELAY STAYS PICKED-UP EVEN THOUGH THERE IS NO VEHICLE OVER THE BARRIER. AFTER 15 SECONDS AT THIS CONDITION, AN ALARM SOUNDS TO ALERT THE GUARD THAT BARRIER'S LOOP CIRCUIT IS LATCHED. THE GUARD MUST VISUALLY CHECK THE BARRIER AND, IF THERE IS NOT A VEHICLE OVER IT, THE PUSH THE LOOP RELEASE TO DROP OUT THE RELAY AND CLEAR THE LOOP LATCH.
   b. TIME DELAY CIRCUIT. AN ALTERNATIVE TO THE LOOP LATCH CIRCUIT DESCRIBED ABOVE IS A CIRCUIT USING A SHORT (0.5 - 1 SECOND) TIME DELAY. A VEHICLE PASSING OVER LOOP 1 PICKS-UP A TIMER RELAY. AFTER THE VEHICLE CLEARS LOOP 1, THE TIMER EXTENDS THE 'ACTIVATION' OF LOOP 1 FOR THE TIME INDICATED. AFTER THE TIME EXPIRES, THEN LOOP 1 PER THE CONTROL LOGIC WILL LOOK LIKE IT IS CLEARED. THE ADDED TIME ALLOWS THE PASSING VEHICLE TO TRAVEL THE DISTANCE BETWEEN LOOPS 1 AND 2 BEFORE THE TIMER RUNS OUT. THE VEHICLE SHOULD BE DETECTED BY LOOP 2, WHICH WILL CONTINUE TO PREVENT BARRIER CLOSURE (DEPLOYMENT) UNTIL THE VEHICLE CLEARS LOOP 2.

15. PUSH BUTTONS WITH A CORRESPONDING INDICATING LIGHT ARE ALLOWED TO BE COMBINED INTO ONE DEVICE.

16. PICTOGRAPHS SHOWING UP/DOWN (CLOSED/OPEN) ARE TO BE PROVIDED BY THE PUSH BUTTONS. CONTROLS PANELS SHOW A 'WEDGE' STYLE IN THIS EXAMPLE. PICTOGRAPH SHALL MATCH THE ACTUAL TYPE OF BARRIER.

17. IF REMOTE MONINTORING OF AN EFO ACTIVATION IS REQUIRED, THEN SEE SHEET E-102.

18. IT IS ALLOWED TO USE OPEN/CLOSE INSTEAD OF UP/DOWN.

19. THE INBOUND AND OUTBOUND LOCAL PANELS CAN BE COMBINED INTO ONE ENCLOSURE IF THE LOCATION OF THE POWER UNITS ARE ADJACENT TO EACH OTHER.

20. OUT-OF-SERVICE SWITCH IS OPTIONAL WHEN THERE IS ONL Y ONE LANE PER DIRECTION OF TRAVEL OR ONE AVB CROSSING MULTIPLE LANES; OTHEWISE, FOR MULTIPLE LANES PER DIRECTION OF TRAVEL PROVIDE.

21. OPERATING PANEL FOR THE SEARCH AREA PANEL IS TO BE MOUNTED IN A NEMA 4 LOCKABLE PANEL OR THE OPERATING PANEL MUST BE WEATHERPROOF.

22. PLACE A PLACARD ON THE MASTER CONTROL PANEL WHICH STATES

SPECIAL ALARMS:

MASTER EFO MODE LOCAL IN LOCAL MODE	MASTER EFO & LOCAL LIGHTS FLASHING
MASTER TEST MODE LOCAL IN LOCAL MODE	MASTER TEST & LOCAL LIGHTS FLASHING
MASTER PLACED EFO MODE & AVBS INCORRECT	MASTER EFO MODE LIGHT FLASH
OUT OF SERVICE	UP & DOWN LIGHTS ALTERNATE FLASH

23. ONE INDICATING LIGHT IS ALLOWED INSTEAD OF TWO INDICATING LIGHTS. CONFIGURATIONS WITH ONE LIGHT MUST BE RED AND ILLUMINATE WHEN SWITCH IS IN THE ARMED POSITION. IT IS ALLOWED TO HAVE THE SWITCH KEYED. IF KEYED ALL REMOTE EFOS CAN BE KEYED ALIKE OR DIFFERENTLY, BUT KEY(S) CANNOT MATCH THE OTHER KEYED SWITCHES.

24. IF ALLOWED IN THE CONTRACT, PROVIDE HARD CONTROL OR TOUCHSCREEN CONTROL FOR THE OPERATING PANELS; HOWEVER, EFO IS REQUIRED TO BE A DISCRETE HARD CONTROL SWITCH WITH A COVER IN BOTH CASES.

25. THIS EFO OPERATING PANEL IS USED ONLY ON ARMY PROJECTS.

26. AIR FORCE. ON AIR FORCE PROJECTS THE VISUAL ALARM IS NOT REQUIRED AS LONG AS THE AUDIBLE ALARM IS PROVIDED.

27. OPTION. THIS IS NOT STANDARD, BUT AN ADDITIONAL KEYED SWITCH IS ALLOWED TO BYPASS THE SAFETY LOOP ON THE ACTIVE VEHICLE BARRIER SO THAT IT CAN BE LOWERED. THIS WOULD HAVE TO BE APPROVED BY THE INSTALLATION.

LEGEND

- KX - KEY DESIGNATION WHERE X CORRESPONDS TO A NUMBER
- (G) - GREEN INDICATING LIGHT
- (R) - RED INDICATING LIGHT
- (A) - AMBER INDICATING LIGHT
- - CONTROL SWITCHES
- - SELECTOR SWITCH
- - KEY OPERATED CONTROL SWITCH
- - EFO SWITCH OR PUSH BUTTON WITH SAFETY COVER (MOMENTARY ACTION)
- - BACK LIT WINDOW OR FLASHING RED INDICATOR

STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGEMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS.

US Army Corps of Engineers
OMAHA DISTRICT

MARK	DESCRIPTION	DATE	APPR.

MARK	DESCRIPTION	DATE	APPR.

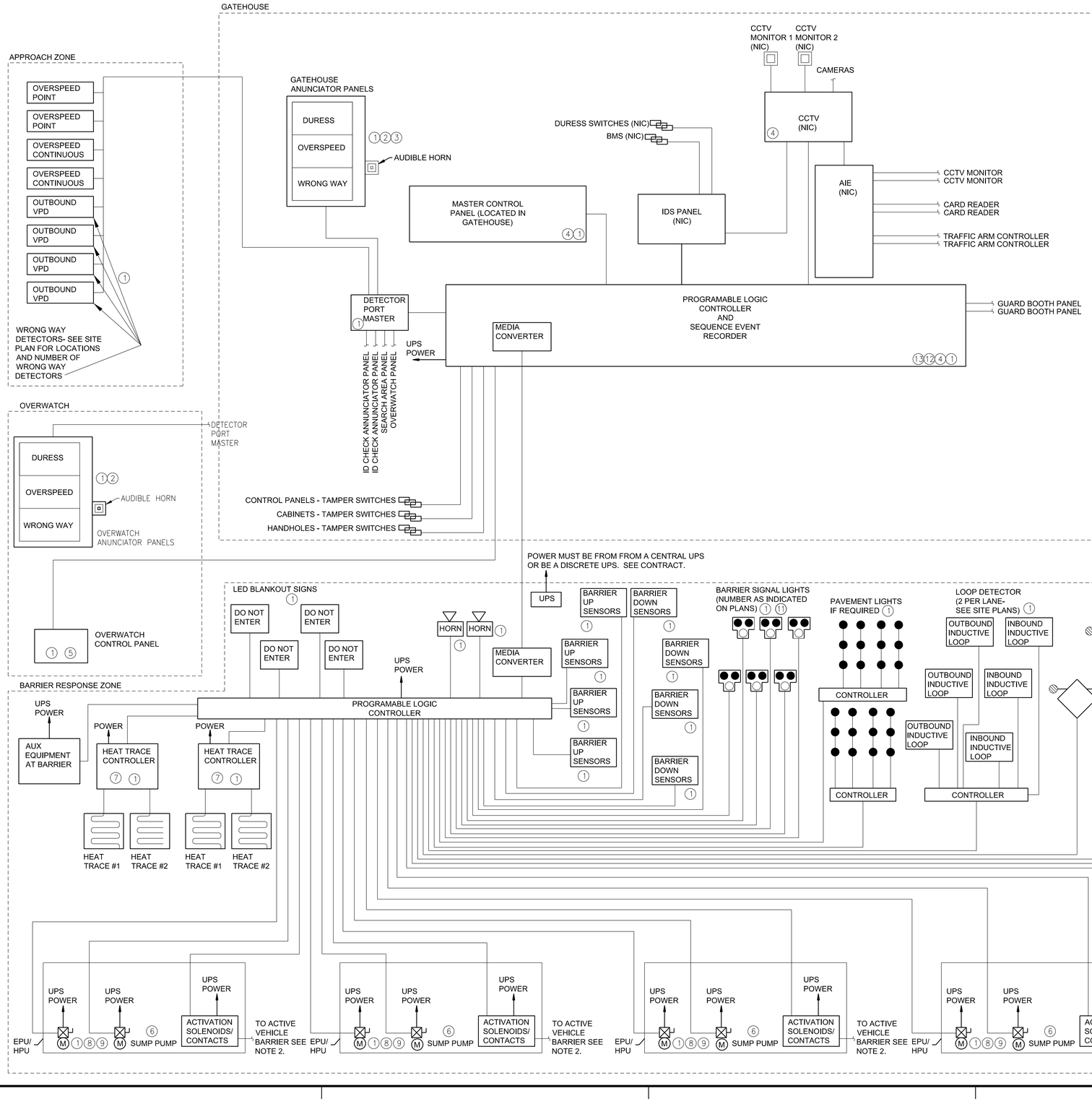
DESIGNED BY: M.MCNAMARA
DRWN BY: M.MCNAMARA
CKD BY: J.MOENCH
SUBMITTED BY: S.LINGREN
DATE: FEBRUARY 2021
SOLICITATION NO.: Z
CONTRACT NO.: Z
PLOT SCALE:
PLOT DATE:
FILE NUMBER: Z
SIZE:
FILE NAME: E-101 HYBRID BEACON AVB PANELS.dgn

US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

HYBRID BEACON
AVB CONTROL PANELS

SHEET IDENTIFICATION
E-101
00

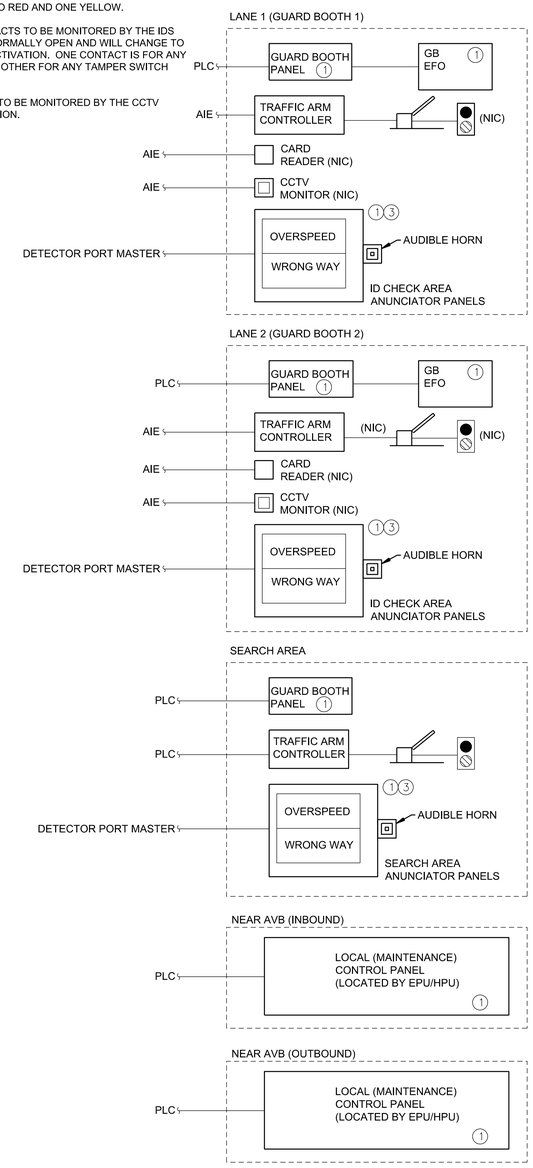


CONSTRUCTION NOTES:

1. PROVIDE DEVICE AND ALL POWER AND CONTROL CONNECTIONS AS REQUIRED.
2. ANNUNCIATOR PANEL WITH AUDIBLE ALARM AND BACKLIT "WRONG WAY" & "DURESS" DISPLAY.
3. CAN BE PART OF MASTER CONTROL PANEL INSTEAD OF SEPARATE PANEL.
4. PROVIDE A DRY CONTACT FOR CCTV CAMERA CONNECTION.
5. PROVIDE A 20' CABLE FOR PANEL PORTABILITY IF AN OVERWATCH PAD INSTEAD OF A BOOTH. PROVIDE ALL CONNECTIONS AND APPURTENANCES AS REQUIRED.
6. OVERWATCH PANEL IS EITHER IN A BUILDING OR A PAVED PAD. PAVED PAD REQUIRES A LONG CORD AND PANEL LARGE ENOUGH TO LOCK THE PANEL IN IT.
7. BARRIER HEAT TAPE.
8. BARRIER EPU OR HPU. IF HPU MOTOR DOES NOT NEED UPS.
9. EPU'S SHALL BE PROVIDED WITH AN UPS THAT MATCHES THE MOTOR & MOTOR CONTROLLER CHARACTERISTICS.
10. BEAM TYPE DETECTORS.
11. HYBRID BEACON WITH TWO RED AND ONE YELLOW.
12. PROVIDE TWO DRY CONTACTS TO BE MONITORED BY THE IDS PANEL. CONTACTS ARE NORMALLY OPEN AND WILL CHANGE TO NORMALLY CLOSED ON ACTIVATION. ONE CONTACT IS FOR ANY EFO ACTIVATION AND THE OTHER FOR ANY TAMPER SWITCH ACTIVATION.
13. PROVIDE DRY CONTACTS TO BE MONITORED BY THE CCTV SYSTEM. SEE SPECIFICATION.

GENERAL NOTES:

1. SEE SITE PLANS FOR RELATIVE EQUIPMENT LOCATIONS. COORDINATE EXACT LOCATIONS WITH END USER PRIOR TO INSTALLATION.
2. INSTALL ALL EQUIPMENT PER MANUFACTURERS REQUIREMENTS. PROVIDE ALL CONDUIT, CONDUCTORS, CABLING, AND ALL ELECTRICAL APPURTENANCES AS REQUIRED FOR A COMPLETE AND FUNCTIONAL INSTALLATION. THIS INCLUDES ANY CHANGES TO CONDUCTORS, CONDUITS, PANELBOARDS, UPS AND GENERATOR.
3. SEE SPECIFICATIONS 34 71 13.19 CRASH RATED ACTIVE VEHICLE BARRIER AND CONTROLS FOR SPECIFIC REQUIREMENTS.
4. DIAGRAM IS FOR FOUR AVBS. TWO GUARDBOOTHS, ONE SEARCH AREA, AND AN OVERWATCH AND FIXED AIE. IF HANDHELD AIE THEN TRAFFIC ARMS/SIGNAL, REAR TAG CAMERA, AND CARD READER ARE NOT PROVIDED BY AIE. PROVIDE TRAFFIC ARM/SIGNAL AS PART OF CONTRACT. DELETE DRIVER INTERFACE CARD READER. PROVIDE CONDUIT FOR THE REAR TAG CAMERA. NOTE THAT THE PEDESTRIAN BOOTH IS NOT SHOWN EVEN THOUGH IT IS ON THE PANEL LAYOUT.



US Army Corps of Engineers
OMAHA DISTRICT

DESCRIPTION	DATE	APPR.	MARK

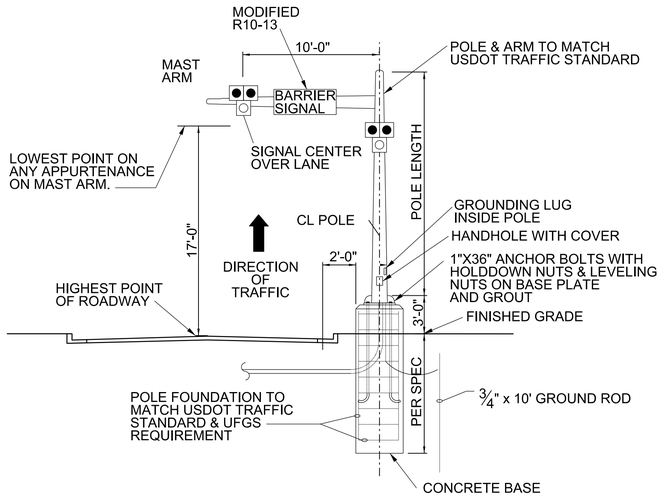
DESIGNED BY: M.MCNAMARA	DATE: FEBRUARY 2021
DWN BY: M.MCNAMARA	SOLICITATION NO.: Z
CKD BY: J.MOENCH	CONTRACT NO.: Z
SUBMITTED BY: S.LINDGREN	FILE NUMBER: Z
PLOT SCALE:	PLOT DATE:
SIZE:	FILE NAME: E-102 HYBRID BEACON CONT AVB SYS DIAGRAM

US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

HYBRID BEACON CONTROL SYSTEM DIAGRAM

SHEET IDENTIFICATION
E-102



1 TY602CH NOT TO SCALE — ELEVATION TYPICAL - HYBRID BEACON

GENERAL NOTES:

1. AT THE END OF 7 SECONDS (TO INCLUDE 3 SECOND REACTION TIME) ALL BARRIERS ARE TO BE FULLY DEPLOYED.

2. DO NOT ENTER LED BLANKOUT SIGN MAY OR MAY NOT BE REQUIRED.

3. 100 dB HORN SHALL BE ADJUSTABLE. HORN IS TO SOUND FOR 10 SECONDS AFTER THE EFO IS PUSHED AND THEN TURN OFF.

4. IN-PAVEMENT LIGHTS ARE ONLY REQUIRED IF THE ACTIVE VEHICLE BARRIER DOES NOT HAVE BARRIER LIGHTS.

5. PROVIDE AT THE ID CHECK CANOPY. A MINIMUM OF ONE PER TWO LANES MOUNTED ON COLUMN NEAR ENTRANCE TO ID CHECK AREA. IT IS OPTIONAL TO HAVE ONE MOUNTED IN THE SEARCH AREA.

PROVIDE 3"-4" HIGH RED LED LETTERING IN A WEATHERPROOF ENCLOSURE. THE WORDING 'OVERSPEED' OR 'WRONG WAY' SHALL ILLUMINATE INDEPENDENTLY. PROVIDE AN AUDIBLE DEVICE WITH A MEANS TO ADJUST THE VOLUME. SEE NOTE 5.

2 TY602CH NOT TO SCALE — OVERSPEED & WRONG WAY WARNING ANNUNCIATOR

HYBRID BEACON - 7 SECOND SAFTEY SCHEME

TRAFFIC CONTROL AND SAFETY AT ACTIVE BARRIERS	OPERATIONAL SEQUENCE PER SECOND (MIN FOR SAFETY - 40 KPH (25 MPH) DESIGN SPEED)										
	TIMELINE (SEC)	--	1	2	3	4	5	6	7	8	9	10
	TRAFFIC CONTROL	NORMAL OPS	GUARD PERCEPTION AND REACTION TIME TO THREAT (BUTTON)			SYSTEM OPERATING AFTER EFO ACTIVATED				THREAT CONTAINED		
HYBRID BEACON SAFETY SCHEME	WARNING SIGN WITH BEACONS	DARK/OFF	DARK/OFF			ALTERNATING FLASHING YELLOW						
	DO NOT ENTER BLANK OUT SIGN	DARK/OFF	DARK/OFF			"DO NOT ENTER" ILLUMINATED						
	HYBRID BEACON	DARK/OFF	DARK/OFF			SOLID YELLOW		ALTERNATING FLASHING RED				
	100 dB HORN (ADJUSTABLE)	SILENT	SILENT			ACTIVATED						
	ACTIVE VEHICLE BARRIER	DOWN/OPEN	DOWN/OPEN			DOWN/OPEN		DEPLOYING		DEPLOYED		
	BARRIER LIGHTS	DARK/OFF	DARK/OFF			ON - FLASHING RED						
	IN-PAVEMENT LIGHTS	DARK/OFF	DARK/OFF			DARK/OFF		ON - STEADY RED				

HYBRID BEACON - 8 SECOND SAFTEY SCHEME

TRAFFIC CONTROL AND SAFETY AT ACTIVE BARRIERS	OPERATIONAL SEQUENCE PER SECOND (MIN FOR SAFETY - 40 KPH (25 MPH) DESIGN SPEED)										
	TIMELINE (SEC)	--	1	2	3	4	5	6	7	8	9	10
	TRAFFIC CONTROL	NORMAL OPS	GUARD PERCEPTION AND REACTION TIME TO THREAT (BUTTON)			SYSTEM OPERATING AFTER EFO ACTIVATED						THREAT CONTAINED
HYBRID BEACON SAFETY SCHEME	WARNING SIGN WITH BEACONS	DARK/OFF	DARK/OFF			ALTERNATING FLASHING YELLOW						
	DO NOT ENTER BLANK OUT SIGN	DARK/OFF	DARK/OFF			"DO NOT ENTER" ILLUMINATED						
	HYBRID BEACON	DARK/OFF	DARK/OFF			SOLID YELLOW			ALTERNATING FLASHING RED			
	100 dB HORN (ADJUSTABLE)	SILENT	SILENT			ACTIVATED						
	ACTIVE VEHICLE BARRIER	DOWN/OPEN	DOWN/OPEN			DOWN/OPEN			DEPLOYING		DEPLOYED	
	BARRIER LIGHTS	DARK/OFF	DARK/OFF			ON - FLASHING RED						
	IN-PAVEMENT LIGHTS	DARK/OFF	DARK/OFF			DARK/OFF			ON - STEADY RED			

HYBRID BEACON - 9 SECOND SAFTEY SCHEME

TRAFFIC CONTROL AND SAFETY AT ACTIVE BARRIERS	OPERATIONAL SEQUENCE PER SECOND (MIN FOR SAFETY - 40 KPH (25 MPH) DESIGN SPEED)											
	TIMELINE (SEC)	--	1	2	3	4	5	6	7	8	9	10
	TRAFFIC CONTROL	NORMAL OPS	GUARD PERCEPTION AND REACTION TIME TO THREAT (BUTTON)			SYSTEM OPERATING AFTER EFO ACTIVATED						THREAT CONTAINED
HYBRID BEACON SAFETY SCHEME	WARNING SIGN WITH BEACONS	DARK/OFF	DARK/OFF			ALTERNATING FLASHING YELLOW						
	DO NOT ENTER BLANK OUT SIGN	DARK/OFF	DARK/OFF			"DO NOT ENTER" ILLUMINATED						
	HYBRID BEACON	DARK/OFF	DARK/OFF			SOLID YELLOW			ALTERNATING FLASHING RED			
	100 dB HORN (ADJUSTABLE)	SILENT	SILENT			ACTIVATED						
	ACTIVE VEHICLE BARRIER	DOWN/OPEN	DOWN/OPEN			DOWN/OPEN				DEPLOYING		DEPLOYED
	BARRIER LIGHTS	DARK/OFF	DARK/OFF			ON - FLASHING RED						
	IN-PAVEMENT LIGHTS	DARK/OFF	DARK/OFF			DARK/OFF				ON - STEADY RED		

DESIGNER:
KEEP THE APPROPRIATE TIME SEQUENCE TABLE. NOTE THAT THERE ARE SIGNIFICANT DIFFERENCES BETWEEN IN THE LAYOUTS BETWEEN THE THREE SUCH AS LOOP SIZE, MEDIAN, PASSIVE VEHICLE BARRIERS, ETC.

US Army Corps of Engineers
OMAHA DISTRICT

MARK	DESCRIPTION	DATE	APPR.

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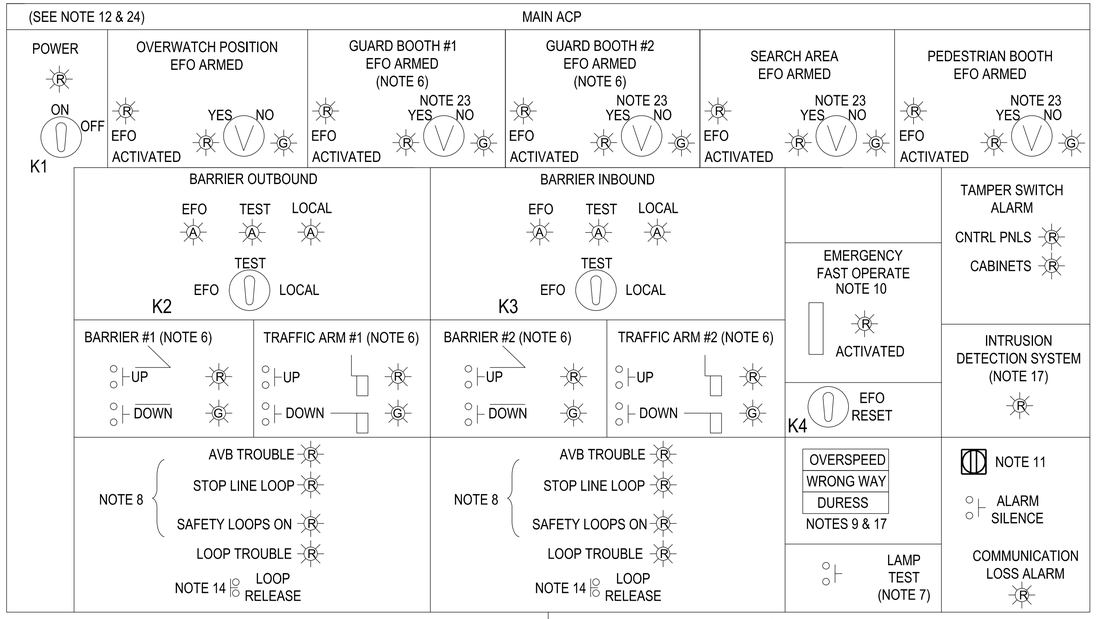
US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

DESIGNED BY: M.MCNAMARA
DRN BY: M.MCNAMARA
CKD BY: J.MOENCH
SUBMITTED BY: S.LINDGREN
DATE: FEBRUARY 2021
SOLICITATION NO.: Z
CONTRACT NO.: Z
PLOT DATE:
PLOT SCALE:
FILE NUMBER: Z
SIZE:
FILE NAME: E-103 HYBRID BEACON CTRL SEQUENCE AND DETAILS

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

HYBRID BEACON AVB CONTROL SEQUENCE AND DETAILS

SHEET IDENTIFICATION
E-103



COMMAND & CONTROL MASTER CONTROL OPERATING PANEL

HIGH EFFICIENCY PRESENCE DETECTION SAFETY SYSTEMS

NOT TO SCALE

NOTES:

1. THE CONTROL PANEL LAYOUTS DEPICT AN ACCESS CONTROL POINT (ACP) WITH A GATEHOUSE, 2 GUARD BOOTHS, PEDESTRIAN BOOTH, A SEARCH AREA, AND AN OVER WATCH POSITION, AND 2 ACTIVE VEHICLE BARRIERS (AVB). THE BARRIER LAYOUTS ARE NOTIONAL SINCE IT WILL VARY WITH EACH ACP AND AVB SYSTEM.

2. BARRIER MODE AND STATUS INDICATING LIGHTS ARE OPTIONAL. PROVIDE AT REQUEST OF THE INSTALLATION. IF THE OVERWATCH IS A PARKING POSITION, IT IS RECOMMENDED TO NOT PROVIDE.

3. PROVIDE A SEPARATE STAND ALONE EMERGENCY FAST OPERATE (EFO) TOGGLE SWITCH OR RED PUSH BUTTON WITH SAFETY COVER MOUNTED ON THE INSIDE OF THE GUARD BOOTH TO THE LEFT OF THE DOOR FRAME FOR EASY ACCESS BY THE GUARD WHO MAY BE STANDING OUTSIDE GUARD BOOTH DURING ID CHECKS.

4. BARRIER MODE SELECTOR SWITCHES SHALL BE KEY OPERATED:

   a. UNDER NORMAL OPERATIONS, THE BARRIER MODE SELECTOR SWITCHES WILL BE IN THEIR EFO POSITIONS WITH KEYS REMOVED AND STORED IN A LOCKED CABINET IN THE GATEHOUSE ACCESSIBLE ONLY BY THE CHIEF OF THE GUARDS.
   b. WHEN PERFORMING BARRIER MAINTENANCE, MAINTENANCE PERSONNEL WILL OBTAIN THE KEY FROM THE CHIEF OF THE GUARDS, PLACE THE SWITCH IN THE "LOCAL" POSITION, AND THEN REMOVE AND RETAIN THE KEY. THE MAINTENANCE PERSON WILL THEN PUT THE KEY IN THE MODE SELECTOR SWITCH ON THE BARRIERS LOCAL CONTROL PANEL LOCATED AT THE BARRIER AND TURN THE KEY TO THE "LOCAL" POSITION TO ACTIVATE THE OPEN AND CLOSE SWITCHES ON THE LOCAL CONTROL PANEL. WHEN MAINTENANCE IS COMPLETE, THE MAINTENANCE PERSON WILL PLACE THE MODE SELECTOR SWITCH ON THE LOCAL CONTROL PANEL BACK TO "OFF" MODE, REMOVE THE KEY, AND RETURN THE KEY TO THE CHIEF OF THE GUARDS. THE CHIEF OF THE GUARDS WILL USE THE KEY TO PLACE THE BARRIER'S MODE SELECTOR SWITCH ON THE MASTER CONTROL PANEL IN THE "EFO" POSITION,AND THEN WILL REMOVE AND LOCKUP THE KEY.
   c. A GUARD MAY TEST OPERATE A BARRIER BY FIRST OBTAINING THE BARRIER'S MODE SWITCH KEY FROM THE CHIEF OF THE GUARDS, PLACING THE MODE SWITCH IN THE "TEST" POSITION, AND THEN OPENING OR CLOSING THE BARRIER WITH THE PUSHBUTTONS ON THE MASTER CONTROL PANEL. UPON COMPLETION OF THE TEST OPERATIONS, THE GUARD WILL RETURN MODE TO "EFO", REMOVE THE KEY, AND RETURN IT TO THE CHIEF OF THE GUARDS. PROCEDURES MUST BE IN PLACE TO ENSURE ALL OPERABLE BARRIERS' MODE SELECTOR SWITCHES ARE PLACED IN THE EFO POSITIONS FOR THE PROPER RESPONSE TO AN EFO COMMAND.

5. SEE UFGS 34 71 13.19 "CRASH RATED ACTIVE VEHICLE BARRIER AND CONTROLS" APPENDIX A "HIGH EFFICIENCY PRESENCE DETECTION SAFETY SYSTEM" FOR DESCRIPTIONS OF THE BARRIER AND TRAFFIC CONTROL SEQUENCES. HEPD IS BASED ON SDDCTEA PAMPHLET 55-15, 2019.

6. LABEL FOR BARRIER AND GUARD BOOTH DESCRIPTION SHALL USE VERBAGE TO HELP DESCRIBE THE LOCATION SUCH AS EAST AND WEST OR INSIDE & OUTSIDE.

7. LAMP TEST PUSH BUTTON SHALL TURN ON ALL INDICATING LIGHTS WHILE BUTTON IS PUSHED WITHOUT EFFECTING ANY CONTROLS.

NOTES CONTINUED:

8. THE INDICATING LIGHT LABELED 'AVB TROUBLE' SHALL COME ON FOR ANY PROBLEMS OR ALARM CONDITIONS AT THE BARRIER, e.g. LOW OIL AIR PRESSURE, LOW VOLTAGE, ETC. THE INDICATING LIGHT LABELED 'SAFETY LOOPS ON' SHALL COME ON WHEN ANY OF THE BARRIER'S VEHICLE PRESENCE DETECTORS (VPD'S) GETS A CALL (VEHICLE DETECTED) FOR MORE THAN 15 SECONDS. THE VPD TROUBLE SHALL COME ON WHEN THERE IS A PROBLEM DETECTED ON THE VEHICLE PRESENCE DETECTORS OR CONTROLLER.

9. OVERSPEED, WRONG-WAY, AND DURESS ALARMS AND CAN EITHER BE BACK LIT WINDOWS OR RED INDICATING LIGHTS. PROVIDE AN ADJUSTABLE AUDIBLE ALARM. ALARMS. DURESS ALARMS SHALL BE ON OVERWATCH POSITION PANEL AND COMMAND & CONTROL MASTER CONTROL PANEL ONLY. SILENCE SWITCH CAN BE USED TO SILENCE AUDIBLE ALARMS. ALL OVERSPEED AND WRONG WAY ALARMS SHALL BE SELF CLEARING. DURESS ALARM DOES NOT NEED TO BE MONITORED AT THE MASTER CONTROL PANEL IF DONE BY ANOTHER PANEL IN THE COMMAND & CONTROL AREA.

10. AREA AROUND EFO SWITCH SHALL BE RED.

11. AUDIBLE ALARM, ALARM SHALL HAVE A MEANS TO ADJUST THE VOLUME.

12. PANEL ORIENTATION AND LABELING SHALL MATCH THE WAY THE GUARD VIEWS THE BARRIERS AND GUARD BOOTHS.

13. CONTROLS SHALL BE MADE SO THAT IF AN AVB IS IN TEST OR LOCAL MODE AND AN EFO IS PUSHED THEN TURNING THE THREE POSITION SWITCH TO EFO PRIOR TO AN EFO RESET SHALL NOT CAUSE THE AVB TO DEPLOY.

14. LOOP SAFETY. WHEN THE PRESENCE DETECTION LOOPS IN FRONT OF AND BEHIND THE BARRIER ARE MORE THAN 10 FEET APART, A SAFETY CIRCUIT MUST BE ADDED TO ENSURE THAT THE BARRIER WILL NOT CLOSE (DEPLOY) ON A VEHICLE THAT IS OVER THE BARRIER BUT BETWEEN THE LOOPS SO IS NOT DETECTED BY EITHER LOOP. THE FOLLOWING ARE APPROVED CIRCUITS:

   a. LATCHING CIRCUIT. WHEN A VEHICLE IS DETECTED BY LOOP 1, THE CONTROL LOGIC PICKS-UP AND SEALS ITSELF IN. AFTER THE VEHICLE PASSES OVER THE BARRIER IT SHOULD BE DETECTED BY LOOP 2 WHICH WILL DROP OUT RELAY FROM LOOP 1. LOOP RELEASE PUSHBUTTON IS REQUIRED TO DROPOUT RELAY LOOP 1 RELAY IN THE EVENT A VEHICLE IS DETECTED BY LOOP 1 BUT IS NOT DETECTED BY LOOP 2. IF THE VEHICLE PASSES OVER THE BARRIER BUT IS NOT DETECTED BY LOOP 2, THE LOOP 1 RELAY STAYS PICKED-UP EVEN THOUGH THERE IS NO VEHICLE OVER THE BARRIER. AFTER 15 SECONDS AT THIS CONDITION, AN ALARM SOUNDS TO ALERT THE GUARD THAT BARRIER'S LOOP CIRCUIT IS LATCHED. THE GUARD MUST VISUALLY CHECK THE BARRIER AND, IF THERE IS NOT A VEHICLE OVER IT, THE PUSH THE LOOP RELEASE TO DROP OUT THE RELAY AND CLEAR THE LOOP LATCH.
   b. TIME DELAY CIRCUIT. AN ALTERNATIVE TO THE LOOP LATCH CIRCUIT DESCRIBED ABOVE IS A CIRCUIT USING A SHORT (0.5 - 1 SECOND) TIME DELAY. A VEHICLE PASSING OVER LOOP 1 PICKS-UP A TIMER RELAY. AFTER THE VEHICLE CLEARS LOOP 1, THE TIMER EXTENDS THE 'ACTIVATION' OF LOOP 1 FOR THE TIME INDICATED. AFTER THE TIME EXPIRES, THEN LOOP 1 PER THE CONTROL LOGIC WILL LOOK LIKE IT IS CLEARED. THE ADDED TIME ALLOWS THE PASSING VEHICLE TO TRAVEL THE DISTANCE BETWEEN LOOPS 1 AND 2 BEFORE THE TIMER RUNS OUT. THE VEHICLE SHOULD BE DETECTED BY LOOP 2, WHICH WILL CONTINUE TO PREVENT BARRIER CLOSURE (DEPLOYMENT) UNTIL THE VEHICLE CLEARS LOOP 2.

15. PUSH BUTTONS WITH A CORRESPONDING INDICATING LIGHT ARE ALLOWED TO BE COMBINED INTO ONE DEVICE.

16. PICTOGRAPHS SHOWING UP/DOWN (CLOSED/OPEN) ARE TO BE PROVIDED BY THE PUSH BUTTONS. CONTROLS PANELS SHOW A 'WEDGE' STYLE IN THIS EXAMPLE. PICTOGRAPH SHALL MATCH THE ACTUAL TYPE OF BARRIER.

17. IF REMOTE MONITORING IS REQUIRED, THEN SEE SHEET E-111.

18. THE INBOUND AND OUTBOUND LOCAL PANELS CAN BE COMBINED INTO ONE PANEL IF THE LOCATION OF THE POWER UNITS ARE ADJACENT TO EACH OTHER.

19. OUT-OF-SERVICE SWITCH IS OPTIONAL.

20. OPERATING PANEL FOR THE SEARCH AREA PANEL - MOUNT IN A NEMA 4 LOCKABLE ENCLOSURE OR THE OPERATING PANEL MUST BE WEATHERPROOF.

21. IT IS ALLOWED TO USE OPEN/CLOSE INSTEAD OF UP/DOWN.

22. SPECIAL ALARM: WHEN TRAFFIC ARM IS NOT FULLY OPEN OR CLOSED FOR MORE THAN 5 SECONDS POSITION LIGHTS FLASH. WHEN GOING BACK TO AVB-UP OR AVB-DOWN & BARRIER AND TRAFFIC ARM IN INCORRECT POSITION THE MODE INDICATOR WILL FLASH.

23. ONE INDICATING LIGHT IS ALLOWED INSTEAD OF TWO INDICATING LIGHTS. CONFIGURATIONS WITH ONE LIGHT MUST BE RED AND ILLUMINATE WHEN SWITCH IS IN THE ARMED POSITION. IT IS ALLOWED TO HAVE THE SWITCH KEYED. IF KEYED ALL REMOTE EFOS CAN BE KEYED ALIKE OR DIFFERENTLY, BUT KEY(S) CANNOT MATCH THE OTHER KEYED SWITCHES.

24. IF ALLOWED IN THE CONTRACT, PROVIDE HARD CONTROL OR TOUCHSCREEN CONTROL FOR THE OPERATING PANELS; HOWEVER, EFO IS REQUIRED TO BE A DISCRETE HARD CONTROL SWITCH WITH A COVER IN BOTH CASES.

25. PLACE A PLACARD ON THE MASTER CONTROL PANEL WHICH STATES:

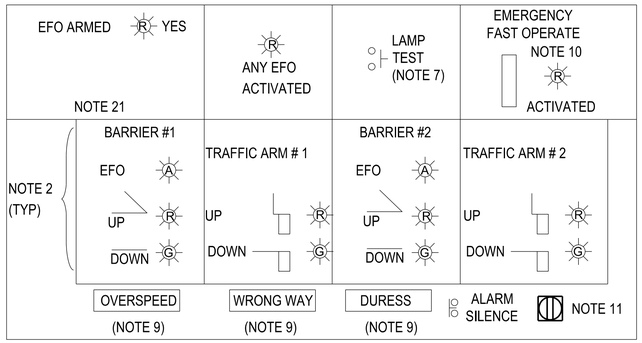
SPECIAL ALARMS:

OUT-OF-SERVICE	ALTERNATING UP/DOWN POSITION LIGHTS
MASTER EFO UP OR EFO DOWN LOCAL IN LOCAL MODE	MASTER EFO & LOCAL LIGHTS FLASHING
MASTER TEST MODE LOCAL IN LOCAL MODE	MASTER TEST & LOCAL LIGHTS FLASHING
MASTER PLACED EFO MODE UP OR EFO DOWN & AVBS INCORRECT	MASTER EFO MODE LIGHT FLASH
TRAFFIC ARM POSITION FAILURE	ALTERNATE UP/DOWN INDICATOR

26. THIS EFO OPERATING PANEL IS ONLY USED ON ARMY PROJECTS.

27. AIR FORCE. ON AIR FORCE PROJECTS, THE VISUAL ALARM IS NOT REQUIRED IF THE AUDIBLE ALARM PROVIDED.

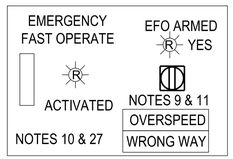
28. OPTION. THIS IS NOT STANDARD, BUT AN ADDITIONAL KEYED SWITCH IS ALLOWED TO BYPASS THE SAFETY LOOP ON THE ACTIVE VEHICLE BARRIER SO THAT IT CAN BE LOWERED. THIS WOULD HAVE TO BE APPROVED BY THE INSTALLATION.



OVERWATCH POSITION CONTROL OPERATING PANEL

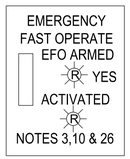
HIGH EFFICIENCY PRESENCE DETECTION SAFETY SYSTEMS

NOT TO SCALE



SEARCH AREA(S) & MAIN GUARD BOOTH OPERATING PANEL

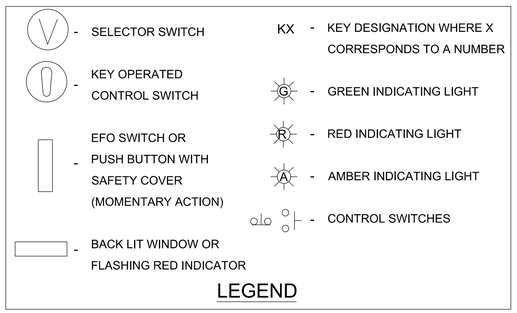
NOT TO SCALE



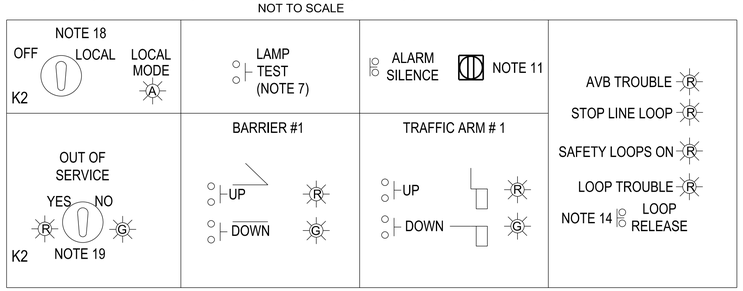
GUARD BOOTH EFO CONTROL BUTTON OPERATING PANEL BY DOOR

NOT TO SCALE

HIGH EFFICIENCY PRESENCE DETECTION SAFETY SYSTEMS



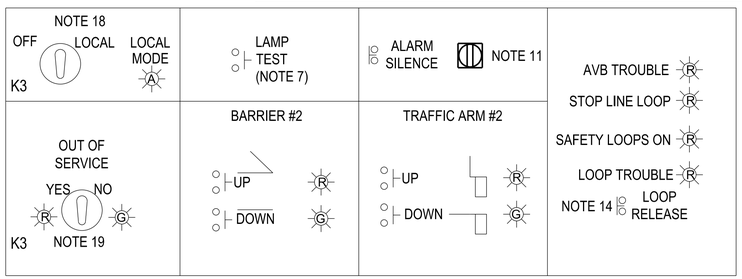
LEGEND



LOCAL CONTROL PANEL AT INBOUND BARRIER

HIGH EFFICIENCY PRESENCE DETECTION SAFETY SYSTEMS

NOT TO SCALE



LOCAL CONTROL PANEL AT OUTBOUND BARRIER

HIGH EFFICIENCY PRESENCE DETECTION SAFETY SYSTEMS

NOT TO SCALE

STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGEMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS.

US Army Corps of Engineers®
OMAHA DISTRICT

MARK	DESCRIPTION	DATE	APPR.

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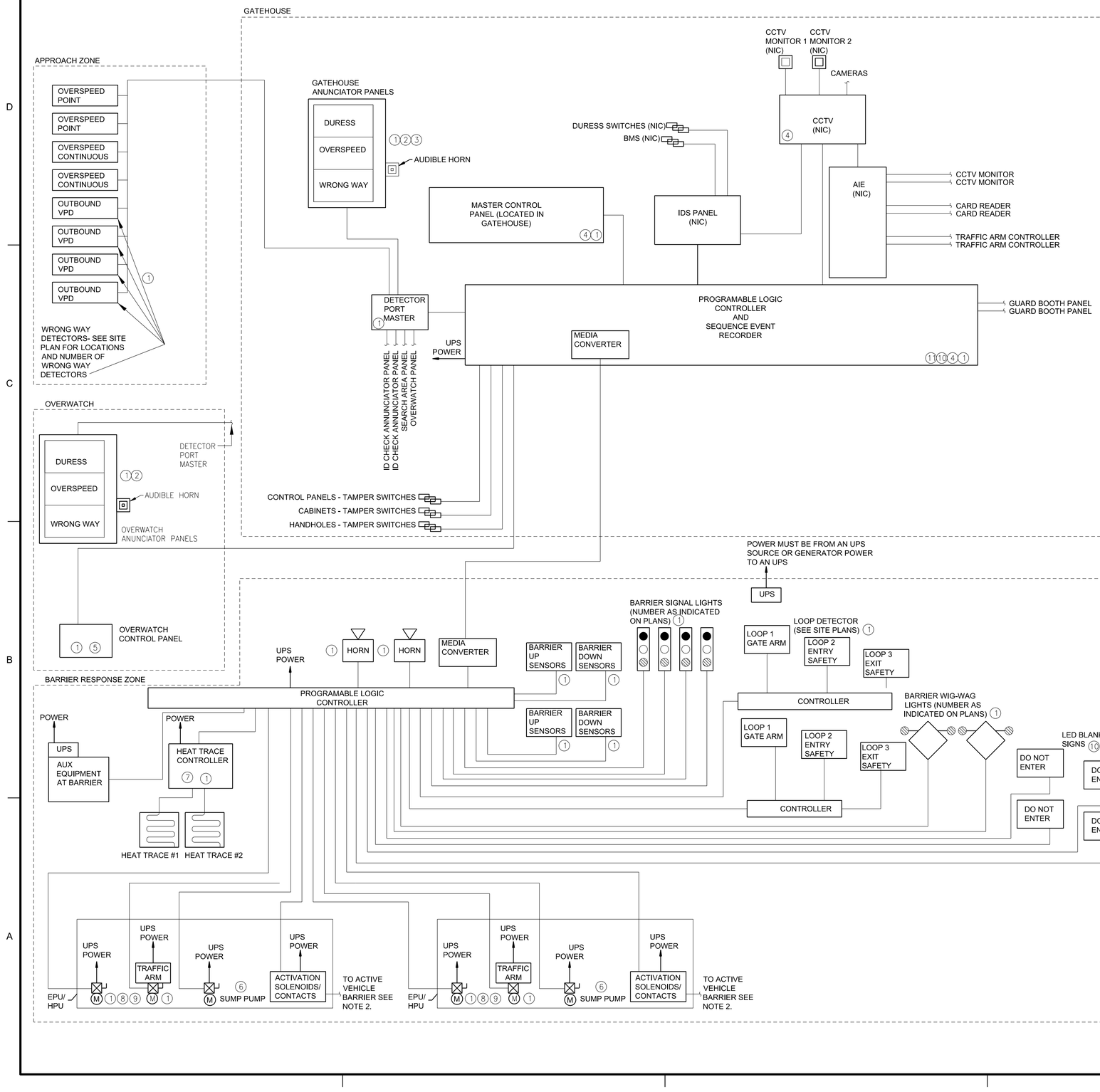
DESIGNED BY: M.MCNAMARA
DWN BY: M.MCNAMARA
CKD BY: J.MCENCH
SUBMITTED BY: S.LINDGREN
DATE: FEBRUARY 2021
SOLICITATION NO.: Z
CONTRACT NO.: Z
PLOT DATE:
FILE NUMBER: Z
PLOT SCALE:
SIZE:
FILE NAME: E-110 HEPD AVB PANELS

US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

HIGH EFFICIENCY PRESENCE DETECTION (HEPD) AVB CONTROL PANELS

SHEET IDENTIFICATION
E-110
00

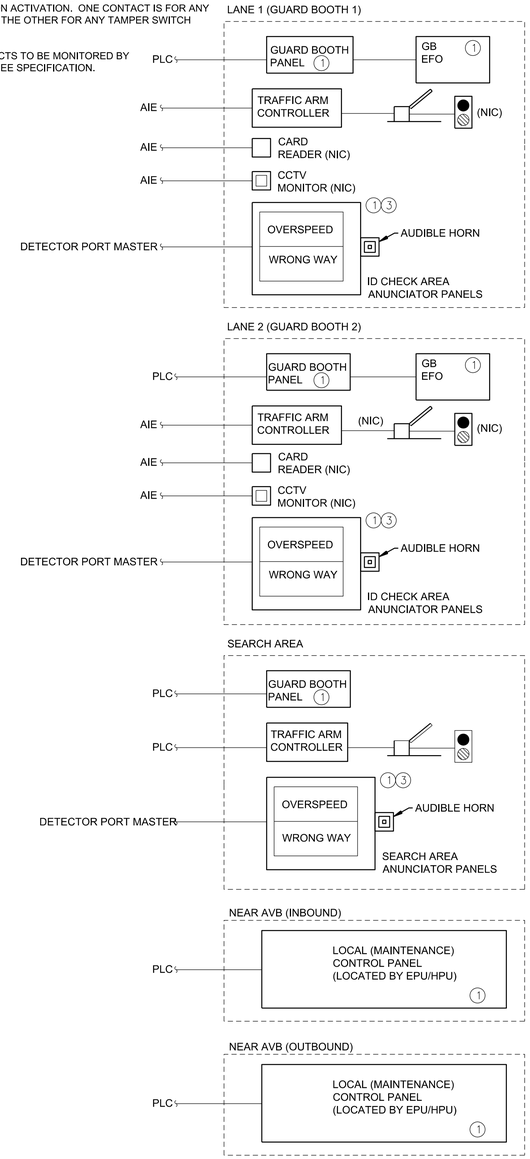


CONSTRUCTION NOTES

1. PROVIDE DEVICE AND ALL POWER AND CONTROL CONNECTIONS AS REQUIRED.
2. ANNUNCIATOR PANEL WITH AUDIBLE ALARM AND BACKLIT "WRONG WAY" & "DURESS" DISPLAY.
3. CAN BE PART OF MASTER CONTROL PANEL INSTEAD OF SEPARATE PANEL.
4. PROVIDE A DRY CONTACT FOR CCTV CAMERA CONNECTION.
5. PROVIDE A 20' CABLE FOR PANEL PORTABILITY IF AN OVERWATCH PAD INSTEAD OF A BOOTH. PROVIDE ALL CONNECTIONS AND APPURTENANCES AS REQUIRED.
6. OVERWATCH PANEL IS EITHER IN A BUILDING OR A PAVED PAD. PAVED PAD REQUIRES A LONG CORD AND PANEL LARGE ENOUGH TO LOCK THE PANEL IN IT.
7. BARRIER HEAT TAPE.
8. BARRIER EPU OR HPU. IF HPU MOTOR DOES NOT NEED UPS.
9. EPU'S SHALL BE PROVIDED WITH AN UPS THAT MATCHES THE MOTOR & MOTOR CONTROLLER CHARACTERISTICS.
10. PROVIDE TWO DRY CONTACTS TO BE MONITORED BY THE IDS PANEL. CONTACTS ARE NORMALLY OPEN AND WILL CHANGE TO NORMALLY CLOSED ON ACTIVATION. ONE CONTACT IS FOR ANY EFO ACTIVATION AND THE OTHER FOR ANY TAMPER SWITCH ACTIVATION.
11. PROVIDE DRY CONTACTS TO BE MONITORED BY THE CCTV SYSTEM. SEE SPECIFICATION.

GENERAL NOTES

1. SEE SITE PLANS FOR RELATIVE EQUIPMENT LOCATIONS. COORDINATE EXACT LOCATIONS WITH END USER PRIOR TO INSTALLATION.
2. INSTALL ALL EQUIPMENT PER MANUFACTURERS REQUIREMENTS. PROVIDE ALL CONDUIT, CONDUCTORS, CABLING, AND ALL ELECTRICAL APPURTENANCES AS REQUIRED FOR A COMPLETE AND FUNCTIONAL INSTALLATION. THIS INCLUDES ANY CHANGES TO CONDUCTORS, CONDUITS, PANELBOARDS, UPS AND GENERATOR.
3. SEE SPECIFICATIONS 34 71 13.19 CRASH RATED ACTIVE VEHICLE BARRIER AND CONTROLS FOR SPECIFIC REQUIREMENTS.
4. DIAGRAM IS FOR TWO AVBS, TWO GUARDBOOTHS, ONE SEARCH AREA, AN OVERWATCH, AND FIXED AIE. IF HANDHELD AIE THEN TRAFFIC ARMS/SIGNALS, REAR TAG CAMERA, AND CARD READER ARE NOT PROVIDED BY AIE. PROVIDE TRAFFIC ARMS/SIGNALS AS PART OF CONTRACT. DELETE DRIVER INTERFACE CARD READER. PROVIDE CONDUIT FOR A REAR TAG CAMERA. PEDESTRIAN BOOTH PANEL IS NOT SHOWN.



US Army Corps of Engineers
OMAHA DISTRICT

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SOLICITATION NO.: Z
CONTRACT NO.: Z
FILE NUMBER: Z
SIZE:
FILE NAME: E-111 HEPD AVB CONTROL SYS DIAGRAM.dgn

US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

HIGH EFFICIENCY PRESENCE DETECTION (HEPD) CONTROL SYSTEM DIAGRAM

SHEET IDENTIFICATION
E-111

HIGH EFFICIENCY PRESENCE DETECTION SAFTEY SCHEME - AVB UP

TRAFFIC CONTROL AND SAFETY AT ACTIVE BARRIERS		OPERATIONAL SEQUENCE PER SECOND (MIN FOR SAFETY - 40 KPH (25 MPH) DESIGN SPEED)											
	TIMELINE (SEC)	--	1	2	3	4	5	6	7	8	9	10	
	TRAFFIC CONTROL	NORMAL OPS	GUARD PERCEPTION AND REACTION TIME TO THREAT (BUTTON)			SYSTEM OPERATION AFTER EFO ACTIVATED				THREAT CONTAINED			
HEPD SAFETY SCHEME	WARNING SIGN WITH BEACONS	DARK/OFF	DARK/OFF			ALTERNATING FLASHING YELLOW							
	LED BLANK OUT SIGNS	DARK/OFF	DARK/OFF			ACTIVATED							
	TRAFFIC SIGNALS	SOLID RED/ NORMAL OPERATIONS	SOLID RED/ NORMAL OPERATIONS			SOLID RED							
	100 dB HORN (ADJUSTABLE)	SILENT	SILENT			ACTIVATED							
	TRAFFIC ARM WITH NO TRAFFIC IN SYSTEM	DEPLOYED (DOWN/CLOSED)	DEPLOYED (DOWN/CLOSED)										
	AVB WITH NO TRAFFIC IN SYSTEM	DEPLOYED (UP/CLOSED)	DEPLOYED (UP/CLOSED)										
	BARRIER LIGHTS	FLASHING RED	ON - FLASHING RED										

HIGH EFFICIENCY PRESENCE DETECTION SAFTEY SCHEME - WHILE PROCESSING TRAFFIC

TRAFFIC CONTROL AND SAFETY AT ACTIVE BARRIERS		OPERATIONAL SEQUENCE PER SECOND (MIN FOR SAFETY - 40 KPH (25 MPH) DESIGN SPEED)											
	TIMELINE (SEC)	--	1	2	3	4	5	6	7	8	9	10	
	TRAFFIC CONTROL	NORMAL OPS	GUARD PERCEPTION AND REACTION TIME TO THREAT (BUTTON)			SYSTEM OPERATION AFTER EFO ACTIVATED				THREAT CONTAINED			
HEPD SAFETY SCHEME	WARNING SIGN WITH BEACONS	DARK/OFF	DARK/OFF			ALTERNATING FLASHING YELLOW							
	LED BLANK OUT SIGNS	DARK/OFF	DARK/OFF			ACTIVATED							
	TRAFFIC SIGNALS	NORMAL OPERATIONS	NORMAL OPERATIONS			SOLID YELLOW		SOLID RED					
	100 dB HORN (ADJUSTABLE)	SILENT	SILENT			ACTIVATED							
	TRAFFIC ARM WITH TRAFFIC IN SYSTEM	NORMAL OPERATIONS	NORMAL OPERATIONS			DEPLOYING		DEPLOYED (DOWN/CLOSED)					
	AVB WITH TRAFFIC IN SYSTEM	NON-DEPLOYED (DOWN/OPEN)	NON-DEPLOYED (DOWN/OPEN)					DEPLOYING		DEPLOYED (DOWN/CLOSED)			
	BARRIER LIGHTS	DARK/OFF	DARK/OFF			ON - FLASHING RED							

PROVIDE 3"-4" HIGH RED LED LETTERING IN A WEATHERPROOF ENCLOSURE. THE WORDING 'OVERSPEED' OR 'WRONG WAY' SHALL ILLUMINATE INDEPENDENTLY. PROVIDE AN AUDIBLE DEVICE WITH A MEANS TO ADJUST THE VOLUME. SEE NOTE 6.

2 Y602G01 OVERSPEED & WRONG WAY WARNING ANNUNCIATOR NOT TO SCALE

GENERAL NOTES:

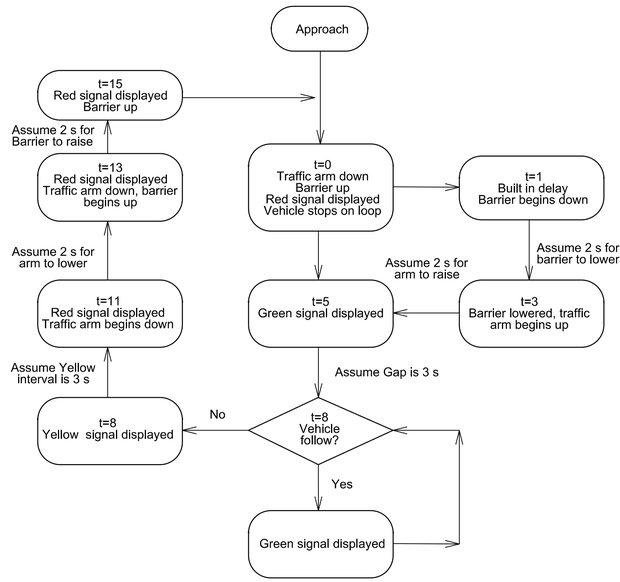
1. NOT USED.

2. 100 dB HORN SHALL BE ADJUSTABLE. HORN IS TO SOUND FOR 10 SECONDS AFTER THE EFO IS PUSHED AND THEN TURN OFF.

4. IN-PAVEMENT LIGHTS ARE ONLY REQUIRED IF THE ACTIVE VEHICLE BARRIER DOES NOT HAVE BARRIER LIGHTS. IF PROVIDED, THE LIGHTS ARE ONLY ON WHEN THE TRAFFIC SIGNAL IS RED.

5. ACTIVE VEHICLE BARRIER LIGHTS ACTIVATE WHEN THE BARRIER IS NOT FULLY DOWN/CLOSED.

6. PROVIDE AT THE ID CHECK CANOPY. A MINIMUM OF ONE PER TWO LANES MOUNTED ON COLUMN NEAR ENTRANCE TO ID CHECK AREA. IT IS OPTIONAL TO HAVE ONE MOUNTED IN THE SEARCH AREA.



PROCESS FLOWCHART FOR NORMAL OPERATIONS - BARRIERS NORMALLY UP

US Army Corps of Engineers®
OMAHA DISTRICT

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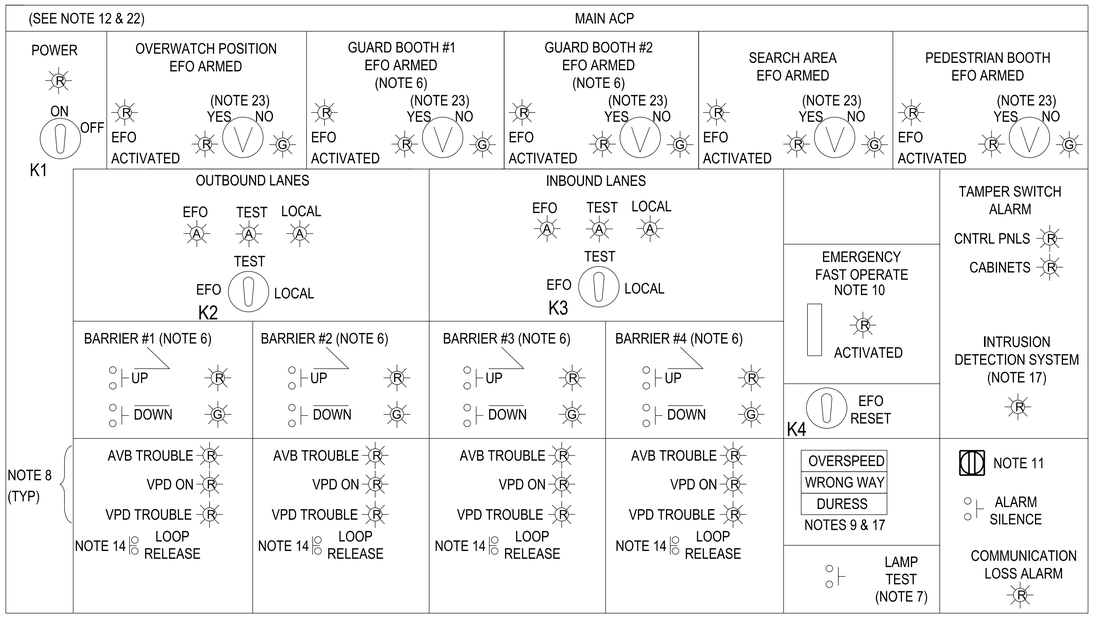
US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

DESIGNED BY: M.MCNAMARA
DWN BY: M.MCNAMARA
SUBMITTED BY: S.LINDGREN
PLOT SCALE:
DATE: FEBRUARY 2021
CKD BY: J.MOENCH
PLOT DATE:
SIZE:
SOLICITATION NO.: Z
CONTRACT NO.: Z
FILE NUMBER: Z
FILE NAME: E-112-HEPD AVB CTRL SEQUENCE AND DETAILS.dgn

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

HIGH EFFICIENCY PRESENCE DETECTION (HEPD) CONTROL SEQUENCE AND DETAILS

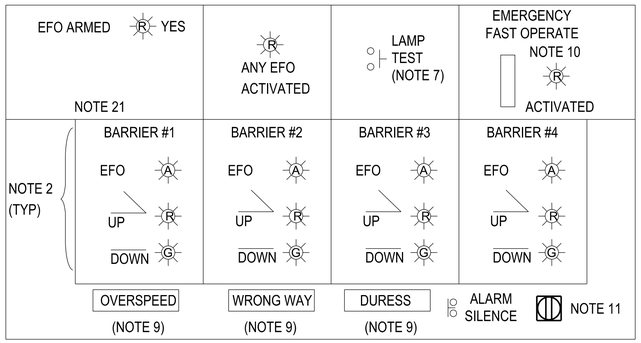
SHEET IDENTIFICATION
E-112



COMMAND & CONTROL MASTER CONTROL OPERATING PANEL

CONVENTIONAL (SIGNS AND SIGNALS)
SAFETY SYSTEM

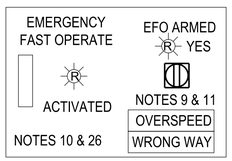
NOT TO SCALE



OVERWATCH POSITION CONTROL OPERATING PANEL

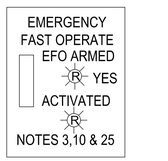
CONVENTIONAL (SIGNS AND SIGNALS)
SAFETY SYSTEM

NOT TO SCALE



SEARCH AREA(S) & MAIN GUARD BOOTH OPERATING PANEL

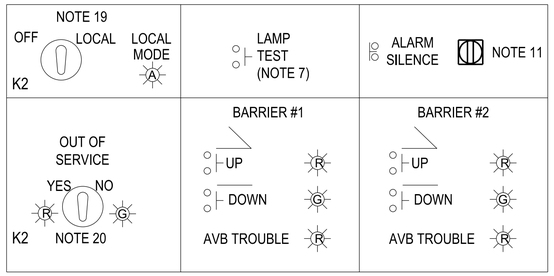
NOT TO SCALE



GUARD BOOTH EFO CONTROL BUTTON OPERATING PANEL BY DOOR

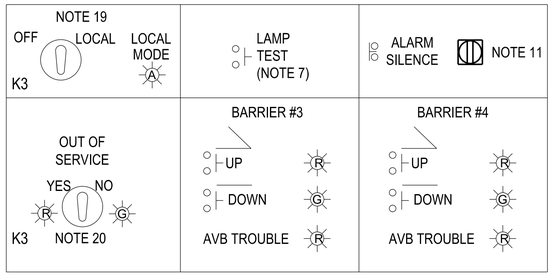
NOT TO SCALE

CONVENTIONAL (SIGNS AND SIGNALS)
SAFETY SYSTEM



LOCAL CONTROL PANEL AT INBOUND BARRIER

CONVENTIAL (SIGNS AND SIGNALS) SAFETY SYSTEM
NOT TO SCALE



LOCAL CONTROL PANEL AT OUTBOUND BARRIER

CONVENTIONAL (SIGNS AND SIGNALS) SAFETY SYSTEM
NOT TO SCALE

NOTES:

1. THE CONTROL PANEL LAYOUTS DEPICT AN ACCESS CONTROL POINT (ACP) WITH A GATEHOUSE, 2 GUARD BOOTHS, PEDESTRIAN BOOTH, A SEARCH AREA, AN OVER WATCH POSITION, AND 4 ACTIVE VEHICLE BARRIERS (AVB). THE BARRIER LAYOUTS ARE NOTIONAL SINCE IT WILL VARY WITH EACH ACP AND AVB SYSTEM.

2. BARRIER MODE AND STATUS INDICATING LIGHTS ARE OPTIONAL. PROVIDE AT REQUEST OF THE INSTALLATION. IF THE OVERWATCH IS A PARKING POSITION, IT IS RECOMMENDED TO NOT PROVIDE.

3. PROVIDE A SEPARATE STAND ALONE EMERGENCY FAST OPERATE (EFO) TOGGLE SWITCH OR RED PUSH BUTTON WITH SAFETY COVER MOUNTED ON THE INSIDE OF THE GUARD BOOTH TO THE LEFT OF THE DOOR FRAME FOR EASY ACCESS BY THE GUARD WHO MAY BE STANDING OUTSIDE GUARD BOOTH DURING ID CHECKS.

4. BARRIER MODE SELECTOR SWITCHES SHALL BE KEY OPERATED:

   a. UNDER NORMAL OPERATIONS,THE BARRIER MODE SELECTOR SWITCHES WILL BE IN THEIR EFO POSITIONS WITH KEYS REMOVED AND STORED IN A LOCKED CABINET IN THE GATEHOUSE ACCESSIBLE ONLY BY THE CHIEF OF THE GUARDS.
   b. WHEN PERFORMING BARRIER MAINTENANCE, MAINTENANCE PERSONNEL WILL OBTAIN THE KEY FROM THE CHIEF OF THE GUARDS, PLACE THE SWITCH IN THE "LOCAL" POSITION, AND THEN REMOVE AND RETAIN THE KEY. THE MAINTENANCE PERSON WILL THEN PUT THE KEY IN THE MODE SELECTOR SWITCH ON THE BARRIERS LOCAL CONTROL PANEL LOCATED AT THE BARRIER AND TURN THE KEY TO THE "LOCAL" POSITION TO ACTIVATE THE OPEN AND CLOSE SWITCHES ON THE LOCAL CONTROL PANEL. WHEN MAINTENANCE IS COMPLETE, THE MAINTENANCE PERSON WILL PLACE THE MODE SELECTOR SWITCH ON THE LOCAL CONTROL PANEL BACK TO "OFF" MODE, REMOVE THE KEY, AND RETURN THE KEY TO THE CHIEF OF THE GUARDS.THE CHIEF OF THE GUARDS WILL USE THE KEY TO PLACE THE BARRIER'S MODE SELECTOR SWITCH ON THE MASTER CONTROL PANEL IN THE "EFO" POSITION, AND THEN WILL REMOVE AND LOCKUP THE KEY.
   c. A GUARD MAY TEST OPERATE A BARRIER BY FIRST OBTAINING THE BARRIER'S MODE SWITCH KEY FROM THE CHIEF OF THE GUARDS, PLACING THE MODE SWITCH IN THE "TEST" POSITION, AND THEN OPENING OR CLOSING THE BARRIER WITH THE PUSHBUTTONS ON THE MASTER CONTROL PANEL. UPON COMPLETION OF THE TEST OPERATIONS, THE GUARD WILL RETURN MODE TO "EFO", REMOVE THE KEY, AND RETURN IT TO THE CHIEF OF THE GUARDS. PROCEDURES MUST BE IN PLACE TO ENSURE ALL OPERABLE BARRIERS' MODE SELECTOR SWITCHES ARE PLACED IN THE EFO POSITIONS FOR THE PROPER RESPONSE TO AN EFO COMMAND.

5. SEE UFGS 34 71 13.19 "CRASH RATED ACTIVE VEHICLE BARRIERS AND CONTROLS" APPENDIX A "HIGH EFFICIENY PRESENCE DETETION (HEPD) AND STOP CONTROL SAFETY SYSTEMS" FOR DESCRIPTIONS OF THE REQUIRED BARRIER AND TRAFFIC CONTROL SEQUENCES. HEPD IS BASED ON SDDCTEA PAMPHLET 55-15, 2019. STOP CONTROL HAS NO OPERATIONAL DIFFERENCE BETWEEN SDDCTEA PAMPHLET 55-15, 2014 AND THE 2019 VERSIONS.

6. LABEL FOR BARRIER AND GUARD BOOTH DESCRIPTION SHALL USE VERBAGE TO HELP DESCRIBE THE LOCATION SUCH AS EAST AND WEST OR INSIDE & OUTSIDE.

7. LAMP TEST PUSH BUTTON SHALL TURN ON ALL INDICATING LIGHTS WHILE BUTTON IS PUSHED WITHOUT EFFECTING ANY CONTROLS.

NOTES CONTINUED:

8. THE INDICATING LIGHT LABELED 'AVB TROUBLE' SHALL COME ON FOR ANY PROBLEMS OR ALARM CONDITIONS AT THE BARRIER, e.g. LOW OIL AIR PRESSURE, LOW VOLTAGE, ETC. THE INDICATING LIGHT LABELED 'VPD ON' SHALL COME ON WHEN ANY OF THE BARRIER'S VEHICLE PRESENCE DETECTORS (VPD'S) GETS A CALL (VEHICLE DETECTED) FOR MORE THAN 15 SECONDS. THE VPD TROUBLE SHALL COME ON WHEN THERE IS A PROBLEM DETECTED ON THE VEHICLE PRESENCE DETECTORS OR CONTROLLER.

9. OVERSPEED, WRONG-WAY, AND DURESS ALARMS AND CAN EITHER BE BACK LIT WINDOWS OR RED INDICATING LIGHTS. PROVIDE AN ADJUSTABLE AUDIBLE ALARM. ALARMS. DURESS ALARMS SHALL BE ON OVERWATCH POSITION PANEL AND COMMAND & CONTROL MASTER CONTROL PANEL ONLY. SILENCE SWITCH CAN BE USED TO SILENCE AUDIBLE ALARMS. ALL OVERSPEED AND WRONG WAY ALARMS SHALL BE SELF CLEARING. DURESS ALARM DOES NOT NEED TO BE MONITORED AT THE MASTER CONTROL PANEL IF DONE BY ANOTHER PANEL IN THE COMMAND & CONTROL AREA.

10. AREA AROUND EFO SWITCH SHALL BE RED.

11. AUDIBLE ALARM, ALARM SHALL HAVE A MEANS TO ADJUST THE VOLUME.

12. PANEL ORIENTATION AND LABELING SHALL MATCH THE WAY THE GUARD VIEWS THE BARRIERS AND GUARD BOOTHS.

13. CONTROLS SHALL BE MADE SO THAT IF AN ACTIVE VEHICLE BARRIER (AVB) IS IN TEST OR LOCAL MODE AND AN EFO IS PUSHED THEN TURNING THE THREE POSITION SWITCH TO EFO PRIOR TO AN EFO RESET SHALL NOT CAUSE THE AVB TO DEPLOY.

14. LOOP SAFETY. WHEN THE PRESENCE DETECTION LOOPS IN FRONT OF AND BEHIND THE BARRIER ARE MORE THAN 10 FEET APART, A SAFETY CIRCUIT MUST BE ADDED TO ENSURE THAT THE BARRIER WILL NOT CLOSE (DEPLOY) ON A VEHICLE THAT IS OVER THE BARRIER BUT BETWEEN THE LOOPS SO IS NOT DETECTED BY EITHER LOOP. THE FOLLOWING ARE APPROVED CIRCUITS:

   a. LATCHING CIRCUIT. WHEN A VEHICLE IS DETECTED BY LOOP 1, THE CONTROL LOGIC PICKS-UP AND SEALS ITSELF IN. AFTER THE VEHICLE PASSES OVER THE BARRIER IT SHOULD BE DETECTED BY LOOP 2 WHICH WILL DROP OUT RELAY FROM LOOP 1. LOOP RELEASE PUSHBUTTON IS REQUIRED TO DROPOUT RELAY LOOP 1 RELAY IN THE EVENT A VEHICLE IS DETECTED BY LOOP 1 BUT IS NOT DETECTED BY LOOP 2. IF THE VEHICLE PASSES OVER THE BARRIER BUT IS NOT DETECTED BY LOOP 2, THE LOOP 1 RELAY STAYS PICKED-UP EVEN THOUGH THERE IS NO VEHICLE OVER THE BARRIER. AFTER 15 SECONDS AT THIS CONDITION, AN ALARM SOUNDS TO ALERT THE GUARD THAT BARRIER'S LOOP CIRCUIT IS LATCHED. THE GUARD MUST VISUALLY CHECK THE BARRIER AND, IF THERE IS NOT A VEHICLE OVER IT, THE PUSH THE LOOP RELEASE TO DROP OUT THE RELAY AND CLEAR THE LOOP LATCH.
   b. TIME DELAY CIRCUIT. AN ALTERNATIVE TO THE LOOP LATCH CIRCUIT DESCRIBED ABOVE IS A CIRCUIT USING A SHORT (0.5 - 1 SECOND) TIME DELAY. A VEHICLE PASSING OVER LOOP 1 PICKS-UP A TIMER RELAY. AFTER THE VEHICLE CLEARS LOOP 1, THE TIMER EXTENDS THE 'ACTIVATION' OF LOOP 1 FOR THE TIME INDICATED. AFTER THE TIME EXPIRES, THEN LOOP 1 PER THE CONTROL LOGIC WILL LOOK LIKE IT IS CLEARED. THE ADDED TIME ALLOWS THE PASSING VEHICLE TO TRAVEL THE DISTANCE BETWEEN LOOPS 1 AND 2 BEFORE THE TIMER RUNS OUT. THE VEHICLE SHOULD BE DETECTED BY LOOP 2, WHICH WILL CONTINUE TO PREVENT BARRIER CLOSURE (DEPLOYMENT) UNTIL THE VEHICLE CLEARS LOOP 2.

15. PUSH BUTTONS WITH A CORRESPONDING INDICATING LIGHT ARE ALLOWED TO BE COMBINED INTO ONE DEVICE.

16. PICTOGRAPHS SHOWING UP/DOWN (CLOSED/OPEN) ARE TO BE PROVIDED BY THE PUSH BUTTONS. CONTROLS PANELS SHOW A 'WEDGE' STYLE IN THIS EXAMPLE. PICTOGRAPH SHALL MATCH THE ACTUAL TYPE OF BARRIER.

17. IF REMOTE MONINTORING OF AN EFO ACTIVATION IS REQUIRED, THEN SEE SHEET E-102.

18. IT IS ALLOWED TO USE OPEN/CLOSE INSTEAD OF UP/DOWN.

19. THE INBOUND AND OUTBOUND LOCAL PANELS CAN BE COMBINED INTO ONE PANEL IF THE LOCATION OF THE POWER UNITS ARE ADJACENT TO EACH OTHER.

20. OUT-OF-SERVICE SWITCH IS OPTIONAL.

21. OPERATING PANEL FOR THE SEARCH AREA PANEL IS TO BE MOUNTED IN A NEMA 4 LOCKABLE PANEL OR THE OPERATING PANEL MUST BE WEATHERPROOF.

22. PLACE A PLACARD ON THE MASTER CONTROL PANEL WHICH STATES SPECIAL ALARMS:

MASTER EFO MODE LOCAL IN LOCAL MODE	MASTER EFO & LOCAL LIGHTS FLASHING
MASTER TEST MODE LOCAL IN LOCAL MODE	MASTER TEST & LOCAL LIGHTS FLASHING
MASTER PLACED EFO MODE & AVBS INCORRECT	MASTER EFO MODE LIGHT FLASH

23. ONE INDICATING LIGHT IS ALLOWED INSTEAD OF TWO INDICATING LIGHTS. CONFIGURATIONS WITH ONE LIGHT MUST BE RED AND ILLUMINATE WHEN SWITCH IS IN THE ARMED POSITION. IT IS ALLOWED TO HAVE THE SWITCH KEYED. IF KEYED ALL REMOTE EFOS CAN BE KEYED ALIKE OR DIFFERENTLY, BUT KEY(S) CANNOT MATCH THE OTHER KEYED SWITCHES.

24. IF ALLOWED IN THE CONTRACT, PROVIDE HARD CONTROL OR TOUCHSCREEN CONTROL FOR THE OPERATING PANELS; HOWEVER, EFO IS REQUIRED TO BE A DISCRETE HARD CONTROL SWITCH WITH A COVER IN BOTH CASES.

25. THIS EFO OPERATING PANEL IS USED ONLY ON ARMY PROJECTS.

26. AIR FORCE. ON AIR FORCE PROJECTS THE VISUAL ALARM IS NOT REQUIRED AS LONG AS THE AUDIBLE ALARM IS PROVIDED.

27. IT IS ALLOWED TO HAVE THE SWITCH KEYED. IF KEYED ALL REMOTE EFOS CAN BE KEYED ALIKE OR DIFFERENTLY, BUT KEY(S) CANNOT MATCH THE OTHER KEYED SWITCHES.

LEGEND

- KX - KEY DESIGNATION WHERE X CORRESPONDS TO A NUMBER
- (G) - GREEN INDICATING LIGHT
- (R) - RED INDICATING LIGHT
- (A) - AMBER INDICATING LIGHT
- - CONTROL SWITCHES
- - SELECTOR SWITCH
- - KEY OPERATED CONTROL SWITCH
- - EFO SWITCH OR PUSH BUTTON WITH SAFETY COVER (MOMENTARY ACTION)
- - BACK LIT WINDOW OR FLASHING RED INDICATOR

STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGEMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS.

US Army Corps of Engineers®
OMAHA DISTRICT

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DATE: FEBRUARY 2021
SOLICITATION NO.: Z
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PLOT DATE:
PLOT SCALE:
FILE NUMBER: Z
FILE NAME: E-120 HYBRID BEACON AND STOP CONTROL PANELS
SIZE:

US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

HYBRID BEACON AND STOP CONTROL AVB CONTROL PANELS

SHEET IDENTIFICATION
E-120
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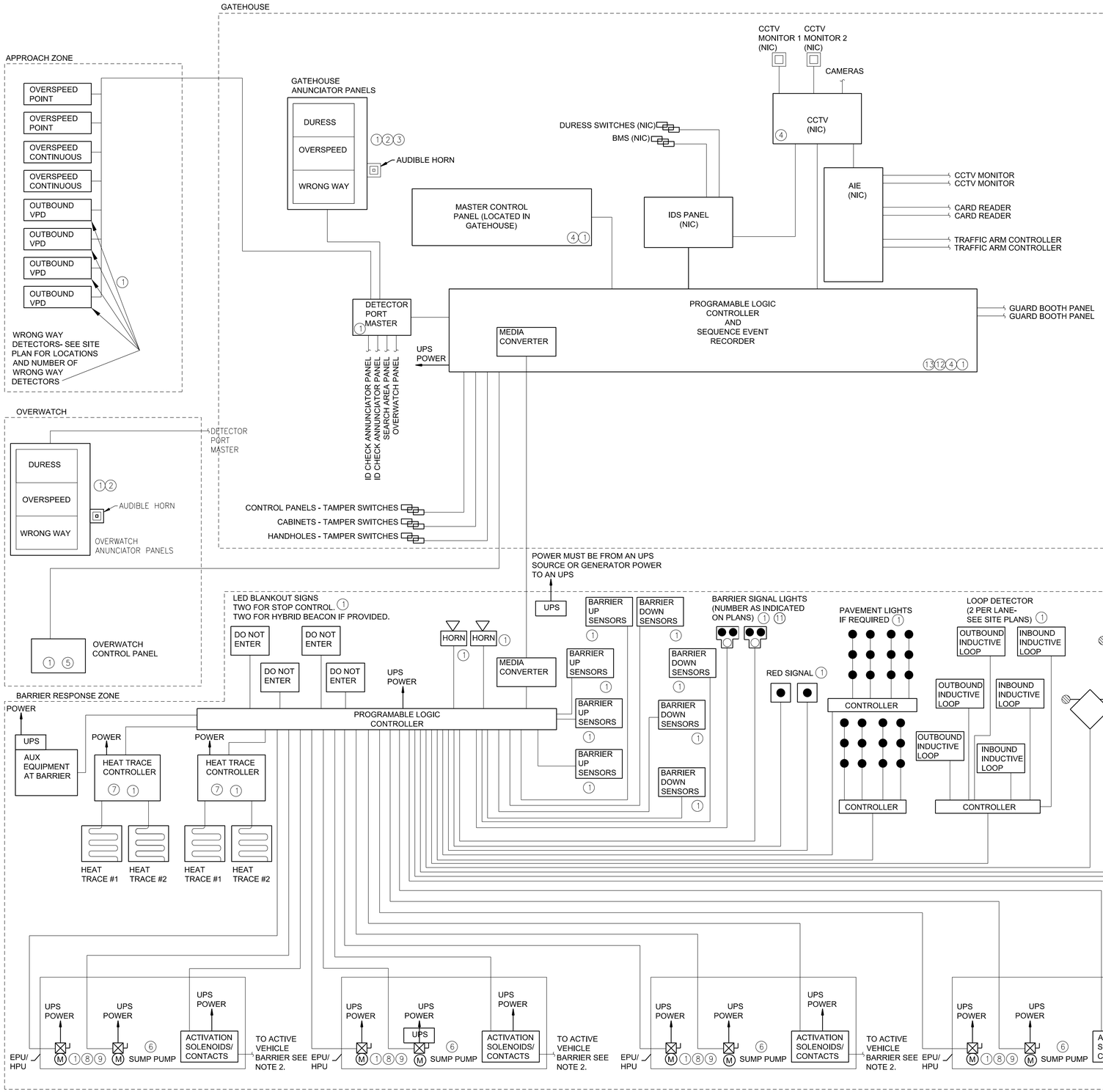

CONSTRUCTION NOTES

1. PROVIDE DEVICE AND ALL POWER AND CONTROL CONNECTIONS AS REQUIRED.
2. ANNUNCIATOR PANEL WITH AUDIBLE ALARM AND BACKLIT "WRONG WAY" & "DURESS" DISPLAY.
3. CAN BE PART OF MASTER CONTROL PANEL INSTEAD OF SEPARATE PANEL.
4. PROVIDE A DRY CONTACT FOR CCTV CAMERA CONNECTION.
5. PROVIDE A 20' CABLE FOR PANEL PORTABILITY IF AN OVERWATCH PAD INSTEAD OF A BOOTH. PROVIDE ALL CONNECTIONS AND APPURTENANCES AS REQUIRED.
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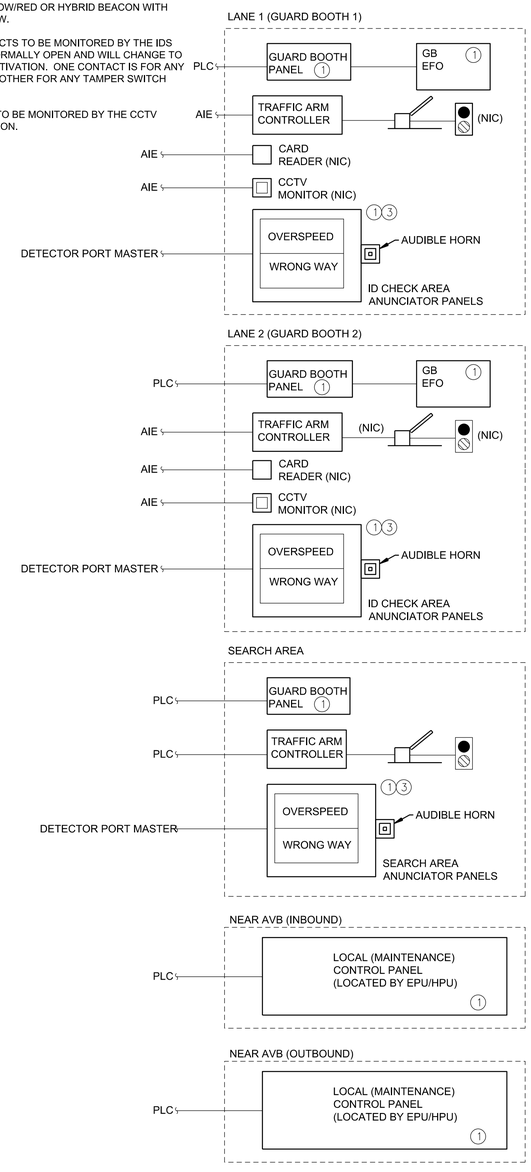
7. BARRIER HEAT TAPE.
8. BARRIER EPU OR HPU. IF HPU MOTOR DOES NOT NEED UPS.
9. EPU'S SHALL BE PROVIDED WITH AN UPS THAT MATCHES THE MOTOR & MOTOR CONTROLLER CHARACTERISTICS.
10. BEAM TYPE DETECTORS.
11. THREE HEAD GREEN/YELLOW/RED OR HYBRID BEACON WITH TWO RED AND ONE YELLOW.
12. PROVIDE TWO DRY CONTACTS TO BE MONITORED BY THE IDS PANEL. CONTACTS ARE NORMALLY OPEN AND WILL CHANGE TO NORMALLY CLOSED ON ACTIVATION. ONE CONTACT IS FOR ANY EFO ACTIVATION AND THE OTHER FOR ANY TAMPER SWITCH ACTIVATION.
13. PROVIDE DRY CONTACTS TO BE MONITORED BY THE CCTV SYSTEM. SEE SPECIFICATION.

GENERAL NOTES

1. SEE SITE PLANS FOR RELATIVE EQUIPMENT LOCATIONS. COORDINATE EXACT LOCATIONS WITH END USER PRIOR TO INSTALLATION.
2. INSTALL ALL EQUIPMENT PER MANUFACTURERS REQUIREMENTS. PROVIDE ALL CONDUIT, CONDUCTORS, CABLING, AND ALL ELECTRICAL APPURTENANCES AS REQUIRED FOR A COMPLETE AND FUNCTIONAL INSTALLATION. THIS INCLUDES ANY CHANGES TO CONDUCTORS, CONDUITS, PANELBOARDS, UPS AND GENERATOR.
3. SEE SPECIFICATIONS 34 71 13.19 CRASH RATED ACTIVE VEHICLE BARRIER AND CONTROLS FOR SPECIFIC REQUIREMENTS.
4. DIAGRAM IS FOR FOUR AVBS. TWO GUARDBOOTHS, ONE SEARCH AREA, AND AN OVERWATCH AND FIXED AIE. IF HANDHELD AIE THEN TRAFFIC ARMS/SIGNAL, REAR TAG CAMERA, AND CARD READER ARE NOT PROVIDED BY AIE. PROVIDE TRAFFIC ARM/SIGNAL AS PART OF CONTRACT. DELETE DRIVER INTERFACE CARD READER. PROVIDE CONDUIT FOR THE REAR TAG CAMERA.



US Army Corps of Engineers
OMAHA DISTRICT

APPR.	DATE	DESCRIPTION

MARK	APPR.	DATE	DESCRIPTION

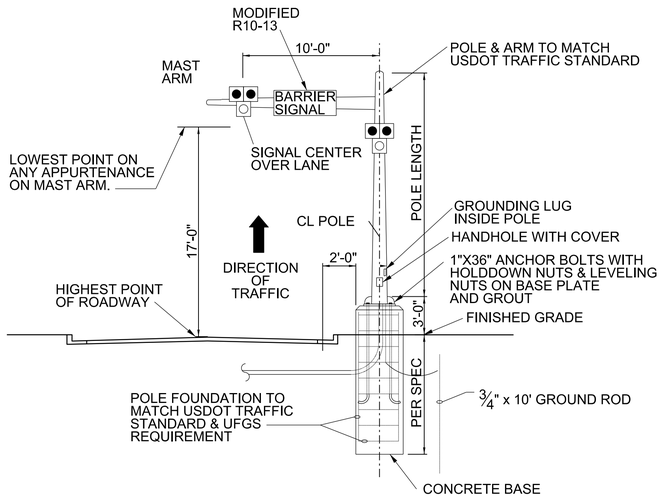
DESIGNED BY: M.MCNAMARA
DRN BY: M.MCNAMARA
CKD BY: J.MOENCH
SUBMITTED BY: S.LINDGREN
DATE: FEBRUARY 2021
SOLICITATION NO.: Z
CONTRACT NO.: Z
FILE NUMBER: Z
PLOT DATE:
PLOT SCALE:
SIZE:
FILE NAME: E-121 HYBRID BEACON & STOP CONTROL SYS DJG NAM50

US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

HYBRID BEACON AND STOP CONTROL SYSTEM DIAGRAM

SHEET IDENTIFICATION
E-121



1 TY602GN NOT TO SCALE — ELEVATION TYPICAL - HYBRID BEACON

PROVIDE 3"-4" HIGH RED LED LETTERING IN A WEATHERPROOF ENCLOSURE. THE WORDING 'OVERSPEED' OR 'WRONG WAY' SHALL ILLUMINATE INDEPENDENTLY. PROVIDE AN AUDIBLE DEVICE WITH A MEANS TO ADJUST THE VOLUME. SEE NOTE 7.

2 TY602GN NOT TO SCALE — OVERSPEED & WRONG WAY WARNING ANNUNCIATOR

GENERAL NOTES:

1. HYBRID BEACON: AT THE END OF 7 SECONDS (TO INCLUDE 3 SECOND REACTION TIME) ALL BARRIERS ARE TO BE FULLY DEPLOYED.

2. STOP CONTROL: AT THE END OF 5 SECONDS (TO INCLUDE 3 SECOND REACTION TIME) ALL BARRIERS ARE TO BE FULLY DEPLOYED.

3. DO NOT ENTER LED BLANKOUT SIGNS ARE REQUIRED WITH STOP CONTROL. THE SIGNS MAY OR MAY NOT BE REQUIRED WITH HYBRID BEACON.

4. 100 dB HORN SHALL BE ADJUSTABLE. HORN IS TO SOUND FOR 10 SECONDS AFTER THE EFO IS PUSHED AND THEN TURN OFF.

5. IN-PAVEMENT LIGHTS ARE ONLY REQUIRED IF THE ACTIVE VEHICLE BARRIER DOES NOT HAVE BARRIER LIGHTS. IF PROVIDED, THE LIGHTS ARE ONLY ON WHEN THE SIGNAL IS RED.

6. ACTIVE VEHICLE BARRIER LIGHTS ACTIVATE WHEN THE BARRIER IS NOT FULLY DOWN/CLOSED.

7. PROVIDE AT THE ID CHECK CANOPY. A MINIMUM OF ONE PER TWO LANES MOUNTED ON COLUMN NEAR ENTRANCE TO ID CHECK AREA. IT IS OPTIONAL TO HAVE ONE MOUNTED IN THE SEARCH AREA.

DESIGNER:
KEEP THE APPROPRIATE TIME SEQUENCE TABLE. NOTE THAT THERE ARE SIGNIFICANT DIFFERENCES BETWEEN IN THE LAYOUTS BETWEEN THE THREE SUCH AS LOOP SIZE, MEDIAN, PASSIVE VEHICLE BARRIERS, ETC.

HYBRID BEACON - 7 SECOND SAFTEY SCHEME

TRAFFIC CONTROL AND SAFETY AT ACTIVE BARRIERS	OPERATIONAL SEQUENCE PER SECOND (MIN FOR SAFETY - 40 KPH (25 MPH) DESIGN SPEED)											
	TIMELINE (SEC)	--	1	2	3	4	5	6	7	8	9	10
	TRAFFIC CONTROL	NORMAL OPS	GUARD PERCEPTION AND REACTION TIME TO THREAT (BUTTON)			SYSTEM OPERATING AFTER EFO ACTIVATED				THREAT CONTAINED		
HYBRID BEACON SAFETY SCHEME	WARNING SIGN WITH BEACONS	DARK/OFF	DARK/OFF			ALTERNATING FLASHING YELLOW						
	DO NOT ENTER BLANK OUT SIGN	DARK/OFF	DARK/OFF			"DO NOT ENTER" ILLUMINATED						
	HYBRID BEACON	DARK/OFF	DARK/OFF			SOLID YELLOW		ALTERNATING FLASHING RED				
	100 dB HORN (ADJUSTABLE)	SILENT	SILENT			ACTIVATED						
	ACTIVE VEHICLE BARRIER	DOWN/OPEN	DOWN/OPEN			DOWN/OPEN		DEPLOYING		DEPLOYED		
	BARRIER LIGHTS	DARK/OFF	DARK/OFF			ON - FLASHING RED						
	IN-PAVEMENT LIGHTS	DARK/OFF	DARK/OFF			DARK/OFF		ON - STEADY RED				

HYBRID BEACON - 8 SECOND SAFTEY SCHEME

TRAFFIC CONTROL AND SAFETY AT ACTIVE BARRIERS	OPERATIONAL SEQUENCE PER SECOND (MIN FOR SAFETY - 40 KPH (25 MPH) DESIGN SPEED)											
	TIMELINE (SEC)	--	1	2	3	4	5	6	7	8	9	10
	TRAFFIC CONTROL	NORMAL OPS	GUARD PERCEPTION AND REACTION TIME TO THREAT (BUTTON)			SYSTEM OPERATING AFTER EFO ACTIVATED						THREAT CONTAINED
HYBRID BEACON SAFETY SCHEME	WARNING SIGN WITH BEACONS	DARK/OFF	DARK/OFF			ALTERNATING FLASHING YELLOW						
	DO NOT ENTER BLANK OUT SIGN	DARK/OFF	DARK/OFF			"DO NOT ENTER" ILLUMINATED						
	HYBRID BEACON	DARK/OFF	DARK/OFF			SOLID YELLOW			ALTERNATING FLASHING RED			
	100 dB HORN (ADJUSTABLE)	SILENT	SILENT			ACTIVATED						
	ACTIVE VEHICLE BARRIER	DOWN/OPEN	DOWN/OPEN			DOWN/OPEN			DEPLOYING		DEPLOYED	
	BARRIER LIGHTS	DARK/OFF	DARK/OFF			ON - FLASHING RED						
	IN-PAVEMENT LIGHTS	DARK/OFF	DARK/OFF			DARK/OFF			ON - STEADY RED			

STOP CONTROL SAFTEY SCHEME

TRAFFIC CONTROL AND SAFETY AT ACTIVE BARRIERS		OPERATIONAL SEQUENCE PER SECOND (MIN FOR SAFETY - 40 KPH (25 MPH) DESIGN SPEED)											
	TIMELINE (SEC)	--	1	2	3	4	5	6	7	8	9	10	
	TRAFFIC CONTROL	NORMAL OPS	GUARD PERCEPTION AND REACTION TIME TO THREAT (BUTTON)			SYSTEM AFTER EFO ACTIVATED		THREAT CONTAINED					
STOP CONTROL SAFETY SCHEME	WARNING SIGN WITH BEACONS	DARK/OFF	DARK/OFF			ALTERNATING FLASHING YELLOW							
	DO NOT ENTER BLANK OUT SIGN	DARK/OFF	DARK/OFF			"DO NOT ENTER" ILLUMINATED							
	RED SIGNAL	DARK/OFF	DARK/OFF			SOLID RED							
	100 dB HORN (ADJUSTABLE)	SILENT	SILENT			ACTIVATED							
	ACTIVE VEHICLE BARRIER	DOWN/OPEN	DOWN/OPEN NORMAL OPERATIONS			DEPLOYING		DEPLOYED (DOWN/CLOSED)					
	BARRIER LIGHTS	DARK/OFF	DARK/OFF			ON - FLASHING RED							

HYBRID BEACON - 9 SECOND SAFTEY SCHEME

TRAFFIC CONTROL AND SAFETY AT ACTIVE BARRIERS	OPERATIONAL SEQUENCE PER SECOND (MIN FOR SAFETY - 40 KPH (25 MPH) DESIGN SPEED)											
	TIMELINE (SEC)	--	1	2	3	4	5	6	7	8	9	10
	TRAFFIC CONTROL	NORMAL OPS	GUARD PERCEPTION AND REACTION TIME TO THREAT (BUTTON)			SYSTEM OPERATING AFTER EFO ACTIVATED						THREAT CONTAINED
HYBRID BEACON SAFETY SCHEME	WARNING SIGN WITH BEACONS	DARK/OFF	DARK/OFF			ALTERNATING FLASHING YELLOW						
	DO NOT ENTER BLANK OUT SIGN	DARK/OFF	DARK/OFF			"DO NOT ENTER" ILLUMINATED						
	HYBRID BEACON	DARK/OFF	DARK/OFF			SOLID YELLOW			ALTERNATING FLASHING RED			
	100 dB HORN (ADJUSTABLE)	SILENT	SILENT			ACTIVATED						
	ACTIVE VEHICLE BARRIER	DOWN/OPEN	DOWN/OPEN			DOWN/OPEN			DEPLOYING		DEPLOYED	
	BARRIER LIGHTS	DARK/OFF	DARK/OFF			ON - FLASHING RED						
	IN-PAVEMENT LIGHTS	DARK/OFF	DARK/OFF			DARK/OFF			ON - STEADY RED			

US Army Corps of Engineers
OMAHA DISTRICT

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PLOT SCALE:
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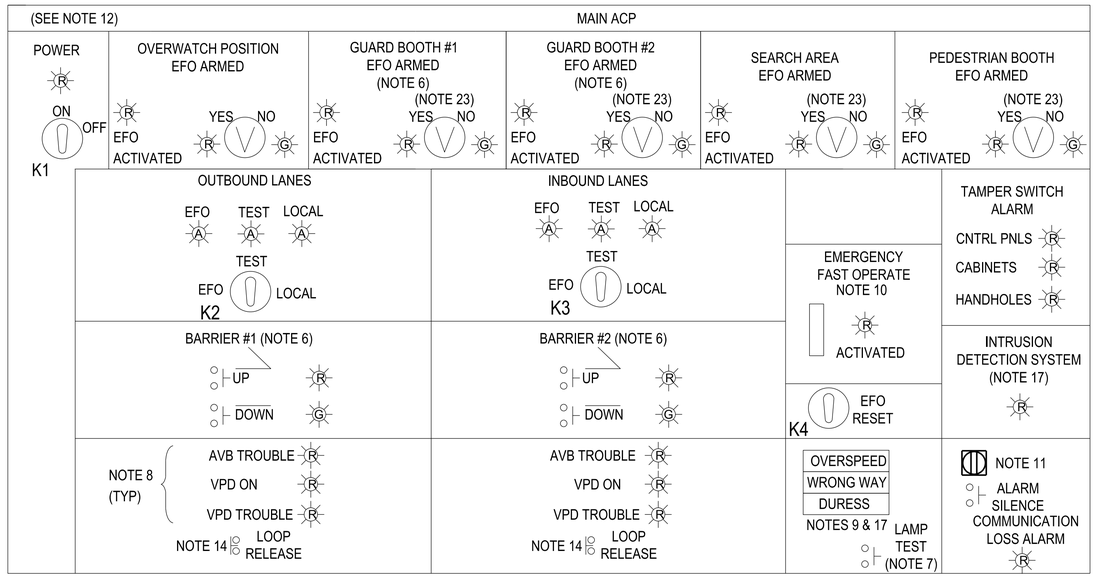
SOLICITATION NO.: Z
CONTRACT NO.: Z
PLOT DATE:
FILE NUMBER: Z
FILE NAME: E-122 HYBRID BEACON & STOP CTRL SEQUENCE & DETAILS.dgn

US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

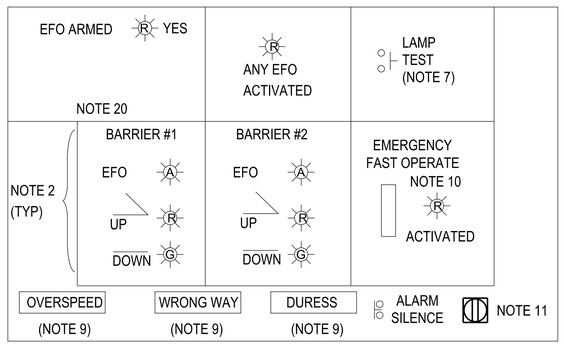
VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

HYBRID BEACON AND STOP CONTROL CONTROL SEQUENCE AND DETAILS

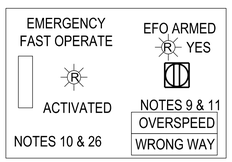
SHEET IDENTIFICATION
E-122



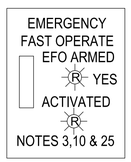
COMMAND & CONTROL MASTER CONTROL OPERATING PANEL
STOP CONTROL
SAFETY SYSTEM
NOT TO SCALE



OVERWATCH POSITION CONTROL OPERATING PANEL
STOP CONTROL
SAFETY SYSTEM
NOT TO SCALE

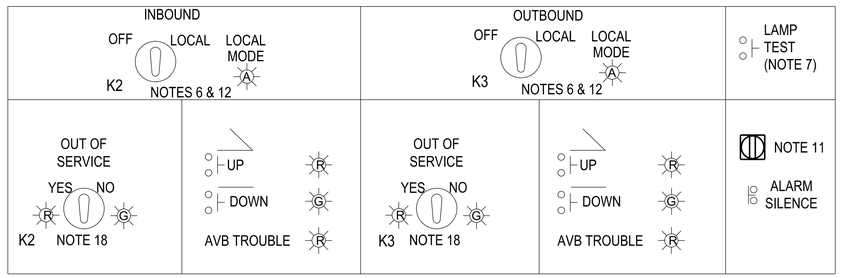


SEARCH AREA(S) & MAIN GUARD BOOTH OPERATING PANEL
NOT TO SCALE



GUARD BOOTH EFO CONTROL BUTTON OPERATING PANEL BY DOOR
NOT TO SCALE

STOP CONTROL SAFETY SYSTEM



LOCAL CONTROL PANEL
STOP CONTROL
SAFETY SYSTEM
NOT TO SCALE

NOTES:

1. THE CONTROL PANEL LAYOUTS DEPICT AN ACCESS CONTROL POINT (ACP) WITH A GATEHOUSE, 2 GUARD BOOTHS, A PEDESTRIAN BOOTH, 1 SEARCH AREA OVER WATCH POSITION, AND 2 ACTIVE VEHICLE BARRIERS (AVB). THE BARRIER LAYOUTS ARE NOTIONAL SINCE IT WILL VARY WITH EACH ACP AND AVB SYSTEM.

2. BARRIER MODE AND STATUS INDICATING LIGHTS ARE OPTIONAL. PROVIDE AT REQUEST OF THE INSTALLATION. IF THE OVERWATCH IS A PARKING POSITION, IT IS RECOMMENDED TO NOT PROVIDE.

3. PROVIDE A SEPARATE STAND ALONE EMERGENCY FAST OPERATE (EFO) TOGGLE SWITCH OR RED PUSH BUTTON WITH SAFETY COVER MOUNTED ON THE INSIDE OF THE GUARD BOOTH TO THE LEFT OF THE DOOR FRAME FOR EASY ACCESS BY THE GUARD WHO MAY BE STANDING OUTSIDE GUARD BOOTH DURING ID CHECKS.

4. BARRIER MODE SELECTOR SWITCHES SHALL BE KEY OPERATED:

   a. UNDER NORMAL OPERATIONS, THE BARRIER MODE SELECTOR SWITCHES WILL BE IN THEIR EFO POSITIONS WITH KEYS REMOVED AND STORED IN A LOCKED CABINET IN THE GATEHOUSE ACCESSIBLE ONLY BY THE CHIEF OF THE GUARDS.
   b. WHEN PERFORMING BARRIER MAINTENANCE, MAINTENANCE PERSONNEL WILL OBTAIN THE KEY FROM THE CHIEF OF THE GUARDS, PLACE THE SWITCH IN THE "LOCAL" POSITION, AND THEN REMOVE AND RETAIN THE KEY. THE MAINTENANCE PERSON WILL THEN PUT THE KEY IN THE MODE SELECTOR SWITCH ON THE BARRIERS LOCAL CONTROL PANEL LOCATED AT THE BARRIER AND TURN THE KEY TO THE "LOCAL" POSITION TO ACTIVATE THE OPEN AND CLOSE SWITCHES ON THE LOCAL CONTROL PANEL. WHEN MAINTENANCE IS COMPLETE, THE MAINTENANCE PERSON WILL PLACE THE MODE SELECTOR SWITCH ON THE LOCAL CONTROL PANEL BACK TO "OFF" MODE, REMOVE THE KEY, AND RETURN THE KEY TO THE CHIEF OF THE GUARDS. THE CHIEF OF THE GUARDS WILL USE THE KEY TO PLACE THE BARRIER'S MODE SELECTOR SWITCH ON THE MASTER CONTROL PANEL IN THE "EFO" POSITION, AND THEN WILL REMOVE AND LOCKUP THE KEY.
   c. A GUARD MAY TEST OPERATE A BARRIER BY FIRST OBTAINING THE BARRIER'S MODE SWITCH KEY FROM THE CHIEF OF THE GUARDS, PLACING THE MODE SWITCH IN THE "TEST" POSITION, AND THEN OPENING OR CLOSING THE BARRIER WITH THE PUSHBUTTONS ON THE MASTER CONTROL PANEL. UPON COMPLETION OF THE TEST OPERATIONS, THE GUARD WILL RETURN MODE TO "EFO", REMOVE THE KEY, AND RETURN IT TO THE CHIEF OF THE GUARDS. PROCEDURES MUST BE IN PLACE TO ENSURE ALL OPERABLE BARRIERS' MODE SELECTOR SWITCHES ARE PLACED IN THE EFO POSITIONS FOR THE PROPER RESPONSE TO AN EFO COMMAND.

5. SEE UFGS 34 71 13.19 "CRASH RATED ACTIVE VEHICLE BARRIER AND CONTROLS" APPENDIX A "STOP CONTROL SAFETY SYSTEM" FOR DESCRIPTIONS OF THE REQUIRED BARRIER AND TRAFFIC CONTROL SEQUENCES. STOP CONTROL IS BASED ON SDDCTEA PAMPHLET 55-15 DATED 2019. THERE ISN'T ANY CONTROL DIFFERNCE BETWEEN THE 2014 AND 2019 VERSIONS. THERE ARE SOME CHANGES BETWEEN THE TWO VERSION SUCH AS LOOP SIZE THAT NEED TO BE TAKEN INTO ACCOUNT.

6. LABEL FOR BARRIER AND GUARD BOOTH DESCRIPTION SHALL USE VERBAGE TO HELP DESCRIBE THE LOCATION SUCH AS EAST AND WEST OR INSIDE & OUTSIDE.

7. LAMP TEST PUSH BUTTON SHALL TURN ON ALL INDICATING LIGHTS WHILE BUTTON IS PUSHED WITHOUT EFFECTING ANY CONTROLS.

8. THE INDICATING LIGHT LABELED 'AVB TROUBLE' SHALL COME ON FOR ANY PROBLEMS OR ALARM CONDITIONS AT THE BARRIER, e.g. LOW OIL AIR PRESSURE, LOW VOLTAGE, ETC. THE INDICATING LIGHT LABELED 'VPD ON' SHALL COME ON WHEN ANY OF THE BARRIER'S VEHICLE PRESENCE DETECTORS (VPD'S) GETS A CALL (VEHICLE DETECTED) FOR MORE THAN 15 SECONDS. THE VPD TROUBLE SHALL COME ON WHEN THERE IS A PROBLEM DETECTED ON THE VEHICLE PRESENCE DETECTORS OR CONTROLLER.

NOTES CONTINUED:

9. OVERSPEED, WRONG-WAY, AND DURESS ALARMS AND CAN EITHER BE BACK LIT WINDOWS OR RED INDICATING LIGHTS. PROVIDE AN ADJUSTABLE AUDIBLE ALARM. ALARMS. DURESS ALARMS SHALL BE ON OVERWATCH POSITION PANEL AND COMMAND & CONTROL MASTER CONTROL PANEL ONLY. SILENCE SWITCH CAN BE USED TO SILENCE AUDIBLE ALARMS. ALL OVERSPEED AND WRONG WAY ALARMS SHALL BE SELF CLEARING. DURESS ALARM DOES NOT NEED TO BE MONITORED AT THE MASTER CONTROL PANEL IF DONE BY SOME OTHER PANEL.

10. AREA AROUND EFO SWITCH SHALL BE RED.

11. AUDIBLE ALARM, ALARM SHALL HAVE A MEANS TO ADJUST THE VOLUME.

12. PANEL ORIENTATION AND LABELING SHALL MATCH THE WAY THE GUARD VIEWS THE BARRIERS AND GUARD BOOTHS.

13. CONTROLS SHALL BE MADE SO THAT IF AN AVB IS IN TEST OR LOCAL MODE AND AN EFO IS PUSHED THEN TURNING THE THREE POSITION SWITCH TO EFO PRIOR TO AN EFO RESET SHALL NOT CAUSE THE AVB TO DEPLOY.

14. LOOP SAFETY. WHEN THE PRESENCE DETECTION LOOPS IN FRONT OF AND BEHIND THE BARRIER ARE MORE THAN 10 FEET APART, A SAFETY CIRCUIT MUST BE ADDED TO ENSURE THAT THE BARRIER WILL NOT CLOSE (DEPLOY) ON A VEHICLE THAT IS OVER THE BARRIER BUT BETWEEN THE LOOPS SO IS NOT DETECTED BY EITHER LOOP. THE FOLLOWING ARE APPROVED CIRCUITS:

   a. LATCHING CIRCUIT. WHEN A VEHICLE IS DETECTED BY LOOP 1, THE CONTROL LOGIC PICKS-UP AND SEALS ITSELF IN. AFTER THE VEHICLE PASSES OVER THE BARRIER IT SHOULD BE DETECTED BY LOOP 2 WHICH WILL DROP OUT RELAY FROM LOOP 1. LOOP RELEASE PUSHBUTTON IS REQUIRED TO DROPOUT RELAY LOOP 1 RELAY IN THE EVENT A VEHICLE IS DETECTED BY LOOP 1 BUT IS NOT DETECTED BY LOOP 2. IF THE VEHICLE PASSES OVER THE BARRIER BUT IS NOT DETECTED BY LOOP 2, THE LOOP 1 RELAY STAYS PICKED-UP EVEN THOUGH THERE IS NO VEHICLE OVER THE BARRIER. AFTER 15 SECONDS AT THIS CONDITION, AN ALARM SOUNDS TO ALERT THE GUARD THAT BARRIER'S LOOP CIRCUIT IS LATCHED. THE GUARD MUST VISUALLY CHECK THE BARRIER AND, IF THERE IS NOT A VEHICLE OVER IT, THE PUSH THE LOOP RELEASE TO DROP OUT THE RELAY AND CLEAR THE LOOP LATCH.
   b. TIME DELAY CIRCUIT. AN ALTERNATIVE TO THE LOOP LATCH CIRCUIT DESCRIBED ABOVE IS A CIRCUIT USING A SHORT (0.5 - 1 SECOND) TIME DELAY. A VEHICLE PASSING OVER LOOP 1 PICKS-UP A TIMER RELAY. AFTER THE VEHICLE CLEARS LOOP 1, THE TIMER EXTENDS THE 'ACTIVATION' OF LOOP 1 FOR THE TIME INDICATED. AFTER THE TIME EXPIRES, THEN LOOP 1 PER THE CONTROL LOGIC WILL LOOK LIKE IT IS CLEARED. THE ADDED TIME ALLOWS THE PASSING VEHICLE TO TRAVEL THE DISTANCE BETWEEN LOOPS 1 AND 2 BEFORE THE TIMER RUNS OUT. THE VEHICLE SHOULD BE DETECTED BY LOOP 2, WHICH WILL CONTINUE TO PREVENT BARRIER CLOSURE (DEPLOYMENT) UNTIL THE VEHICLE CLEARS LOOP 2.

15. PUSH BUTTONS WITH A CORRESPONDING INDICATING LIGHT ARE ALLOWED TO BE COMBINED INTO ONE DEVICE.

16. PICTOGRAPHS SHOWING UP/DOWN (CLOSED/OPEN) ARE TO BE PROVIDED BY THE PUSH BUTTONS. CONTROLS PANELS SHOW A 'WEDGE' STYLE IN THIS EXAMPLE. PICTOGRAPH SHALL MATCH THE ACTUAL TYPE OF BARRIER.

17. IF REMOTE MONITORING OF AN EFO IS REQUIRED, SEE SHEET E-131.

18. OUT-OF-SERVICE SWITCH IS OPTIONAL WHEN THERE IS A SINGLE LANE PER DIRECTION OF TRAVEL. WHEN MULTIPLE LANES PER DIRECTION OF TRAVEL AND THE LANES ARE NOT SEPARATED BY AN ISLAND, THEN PROVIDE AN OUT OF SERVICE SWITCH FOR EACH AVB.

19. OPERATING PANEL FOR THE SEARCH AREA PANEL IS TO BE MOUNTED IN A NEMA 4 LOCKABLE ENCLOSURE OR THE OPERATING PANEL MUST BE WEATHERPROOF.

20. IT IS ALLOWED TO USE OPEN/CLOSE INSTEAD OF UP/DOWN.

21. VPD ON, LOOP ON, AND BEAM ON INDICATE ACTIVATION OF SENSOR FOR OVER 15 SECONDS.

22. PLACE A PLACARD ON THE MASTER CONTROL PANEL WHICH STATES:

SPECIAL ALARMS:

OUT-OF-SERVICE	ALTERNATING UP/DOWN POSITION LIGHTS
MASTER EFO MODE LOCAL IN LOCAL MODE	MASTER EFO & LOCAL LIGHTS FLASHING
MASTER TEST MODE LOCAL IN LOCAL MODE	MASTER TEST & LOCAL LIGHTS FLASHING
MASTER PLACED EFO MODE & AVBS INCORRECT	MASTER EFO MODE LIGHT FLASH
OUT OF SERVICE	ALTERNATING FLASHING UP AND DOWN LIGHTS

23. ONE INDICATING LIGHT IS ALLOWED INSTEAD OF TWO INDICATING LIGHTS. CONFIGURATIONS WITH ONE LIGHT MUST BE RED AND ILLUMINATE WHEN SWITCH IS IN THE ARMED POSITION. IT IS ALLOWED TO HAVE THE SWITCH KEYED. IF KEYED ALL REMOTE EFOS CAN BE KEYED ALIKE OR DIFFERENTLY, BUT KEY(S) CANNOT MATCH THE OTHER KEYED SWITCHES.

24. IF ALLOWED BY THE CONTRACT, PROVIDE HARD CONTROL OR TOUCHSCREEN CONTROL FOR THE OPERATING PANELS; HOWEVER, EFO IS REQUIRED TO BE A DISCRETE HARD CONTROL SWITCH WITH A COVER IN BOTH CASES.

25. THIS EFO OPERATING PANEL IS USED ONLY ON ARMY PROJECTS.

26. AIR FORCE. ON AIR FORCE PROJECTS, THE VISUAL ALARM IS NOT REQUIRED AS LONG AS THE AUDIBLE ALARM IS PROVIDED.

27. IT IS ALLOWED TO HAVE THE SWITCH KEYED. IF KEYED ALL REMOTE EFOS CAN BE KEYED ALIKE OR DIFFERENTLY, BUT KEY(S) CANNOT MATCH THE OTHER KEYED SWITCHES.

LEGEND

- KX - KEY DESIGNATION WHERE X CORRESPONDS TO A NUMBER
- (G) - GREEN INDICATING LIGHT
- (R) - RED INDICATING LIGHT
- (A) - AMBER INDICATING LIGHT
- - CONTROL SWITCHES
- - SELECTOR SWITCH
- - KEY OPERATED CONTROL SWITCH
- - EFO SWITCH OR PUSH BUTTON WITH SAFETY COVER (MOMENTARY ACTION)
- - BACK LIT WINDOW OR FLASHING RED INDICATOR

STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGEMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS.

US Army Corps of Engineers®
OMAHA DISTRICT

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DESIGNED BY: M.MCNAMARA
DWN BY: M.MCNAMARA
CKD BY: J.MCENCH
SUBMITTED BY: S.LINDGREN
DATE: FEBRUARY 2021
SOLICITATION NO.: Z
CONTRACT NO.: Z
FILE NUMBER: Z
PLOT DATE:
PLOT SCALE:
SIZE:
FILE NAME: E-130 STOP CONTROL AVB PANELS

US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

STOP CONTROL
AVB CONTROL PANELS

SHEET IDENTIFICATION
E-130
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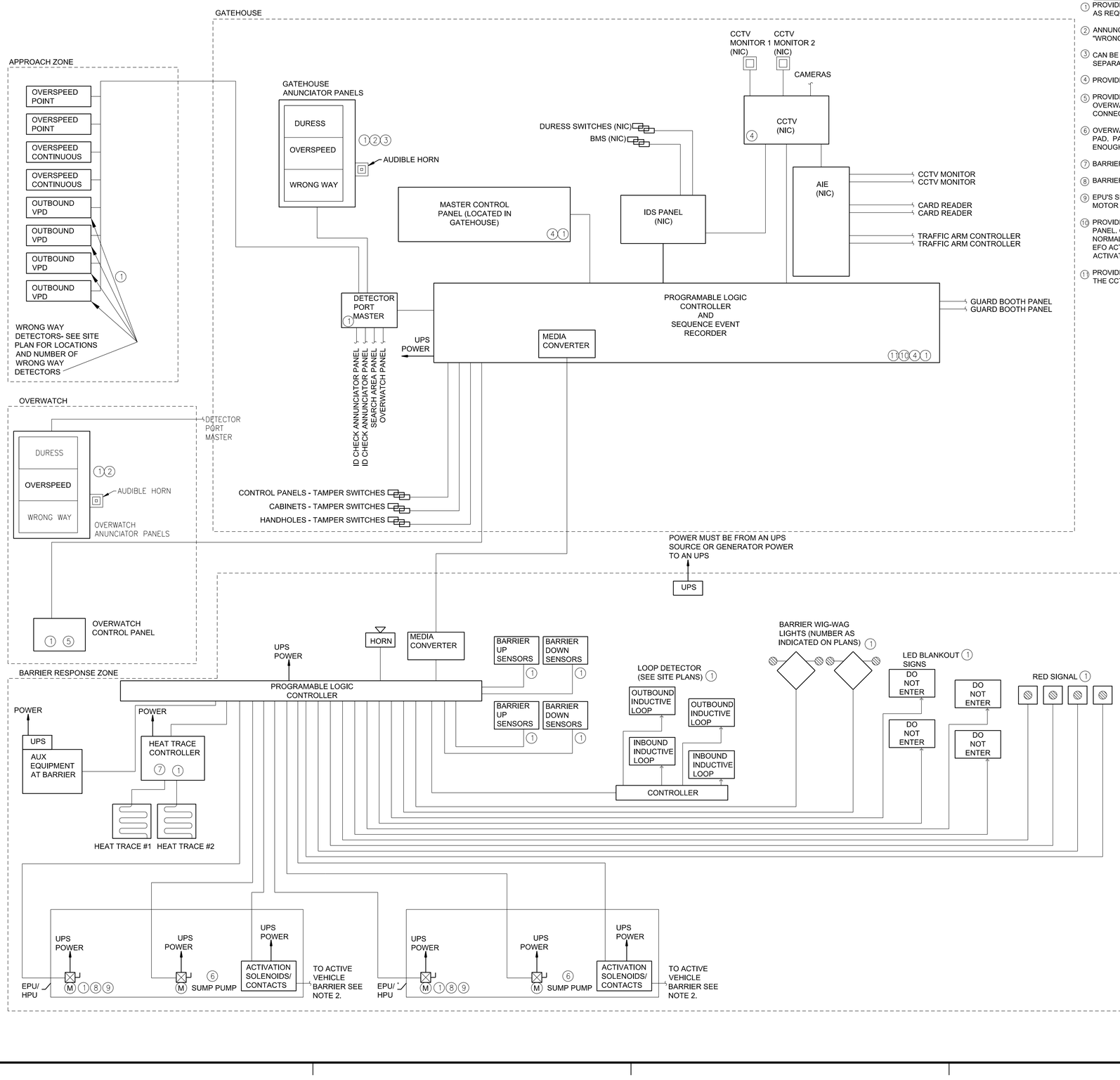

CONSTRUCTION NOTES

1. PROVIDE DEVICE AND ALL POWER AND CONTROL CONNECTIONS AS REQUIRED.
2. ANNUNCIATOR PANEL WITH AUDIBLE ALARM AND BACKLIT "WRONG WAY" & "DURESS" DISPLAY.
3. CAN BE PART OF MASTER CONTROL PANEL INSTEAD OF SEPARATE PANEL.
4. PROVIDE A DRY CONTACT FOR CCTV CAMERA CONNECTION.
5. PROVIDE A 20' CABLE FOR PANEL PORTABILITY IF AN OVERWATCH PAD INSTEAD OF A BOOTH. PROVIDE ALL CONNECTIONS AND APPURTENANCES AS REQUIRED.
6. OVERWATCH IS PANEL IS EITHER IN A BUILDING OR A PAVED PAD. PAVED PAD REQUIRES A LONG CORD AND PANEL LARGE ENOUGH TO LOCK THE PANEL IN IT.
7. BARRIER HEAT TAPE.
8. BARRIER EPU OR HPU. IF HPU MOTOR DOES NOT NEED UPS.
9. EPU'S SHALL BE PROVIDED WITH AN UPS THAT MATCHES THE MOTOR & MOTOR CONTROLLER CHARACTERISTICS.
10. PROVIDE TWO DRY CONTACTS TO BE MONITORED BY THE IDS PANEL. CONTACTS ARE NORMALLY OPEN AND WILL CHANGE TO NORMALLY CLOSED ON ACTIVATION. ONE CONTACT IS FOR ANY EFO ACTIVATION AND THE OTHER FOR ANY TAMPER SWITCH ACTIVATION.
11. PROVIDE DRY CONTACTS TO BE MONITORED BY THE CCTV SYSTEM. SEE SPECIFICATION.

GENERAL NOTES

1. SEE SITE PLANS FOR RELATIVE EQUIPMENT LOCATIONS. COORDINATE EXACT LOCATIONS WITH END USER PRIOR TO INSTALLATION.
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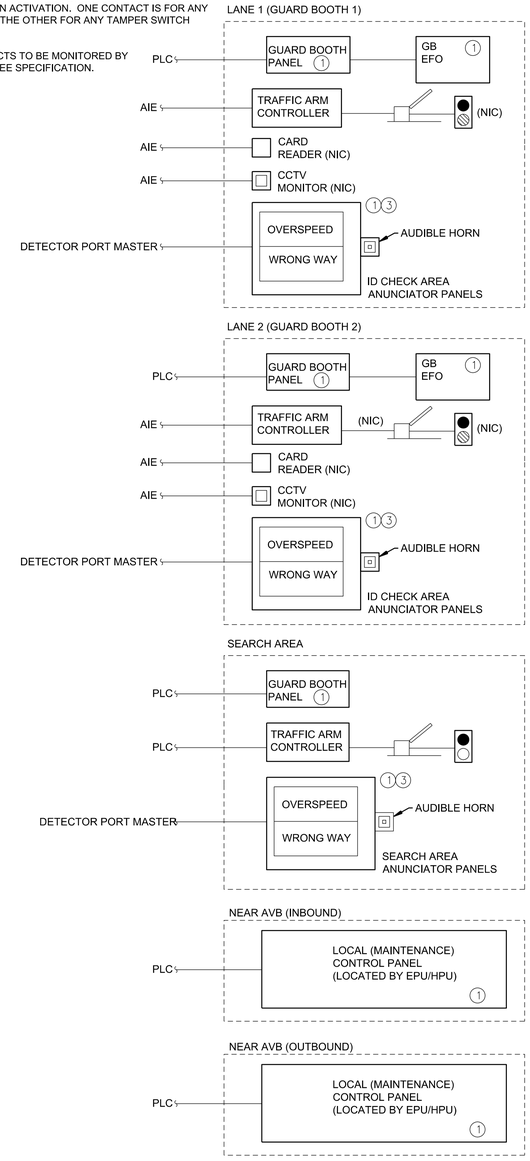
3. SEE SPECIFICATIONS 34 71 13.19 CRASH RATED ACTIVE VEHICLE BARRIER AND CONTROLS FOR SPECIFIC REQUIREMENTS.
4. DIAGRAM IS FOR TWO AVBS, TWO GUARDBOOTHS, ONE SEARCH AREA, AN OVERWATCH, AND FIXED AIE. IF HANDHELD AIE THEN TRAFFIC ARMS/SIGNALS, CARD READER, AND REAR TAG CAMERAS ARE NOT PROVIDED BY AIE. PROVIDE TRAFFIC ARMS/SIGNALS AS PART OF CONTRACT. DELETE DRIVER INTERFACE CARD READER. PROVIDE CONDUIT FOR THE REAR TAG CAMERA.



US Army Corps of Engineers
OMAHA DISTRICT

MARK	DESCRIPTION	DATE	APPR.

MARK	DESCRIPTION	DATE	APPR.

DESIGNED BY: M.MCNAMARA
DRAWN BY: M.MCNAMARA
SUBMITTED BY: S.LINDGREN
DATE: FEBRUARY 2021
CKD BY: J.MOENCH
PLOT SCALE:
PLOT DATE:
SOLICITATION NO.: Z
CONTRACT NO.: Z
FILE NUMBER: Z
SIZE:
FILE NAME: E-131 STOP CTRL AVB CTRL SYS DIAGRAM.dgn

US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

STOP CONTROL - CONTROL SYSTEM DIAGRAM

SHEET IDENTIFICATION
E-131

STOP CONTROL SAFTEY SCHEME

TRAFFIC CONTROL AND SAFETY AT ACTIVE BARRIERS		OPERATIONAL SEQUENCE PER SECOND (MIN FOR SAFETY - 40 KPH (25 MPH) DESIGN SPEED)											
	TIMELINE (SEC)	--	1	2	3	4	5	6	7	8	9	10	
	TRAFFIC CONTROL	NORMAL OPS	GUARD PERCEPTION AND REACTION TIME TO THREAT (BUTTON)			SYSTEM AFTER EFO ACTIVATED		THREAT CONTAINED					
STOP CONTROL SAFETY SCHEME	WARNING SIGN WITH BEACONS	DARK/OFF	DARK/OFF			ALTERNATING FLASHING YELLOW							
	DO NOT ENTER BLANK OUT SIGN	DARK/OFF	DARK/OFF			"DO NOT ENTER" ILLUMINATED							
	RED SIGNAL	DARK/OFF	DARK/OFF			SOLID RED							
	100 dB HORN (ADJUSTABLE)	SILENT	SILENT			ACTIVATED							
	ACTIVE VEHICLE BARRIER	DOWN/OPEN	DOWN/OPEN NORMAL OPERATIONS			DEPLOYING		DEPLOYED (DOWN/CLOSED)					
	BARRIER LIGHTS	DARK/OFF	DARK/OFF			ON - FLASHING RED							

PROVIDE 3"-4" HIGH RED LED LETTERING IN A WEATHERPROOF ENCLOSURE. THE WORDING 'OVERSPEED' OR 'WRONG WAY' SHALL ILLUMINATE INDEPENDENTLY. PROVIDE AN AUDIBLE DEVICE WITH A MEANS TO ADJUST THE VOLUME. SEE NOTE 6.

2 TY602C NOT TO SCALE — OVERSPEED & WRONG WAY WARNING ANNUNCIATOR

GENERAL NOTES:

1. AT THE END OF 5 SECONDS (TO INCLUDE 3 SECOND REACTION TIME) ALL BARRIERS ARE TO BE FULLY DEPLOYED.

2. 100 dB HORN SHALL BE ADJUSTABLE. HORN IS TO SOUND FOR 10 SECONDS AFTER THE EFO IS PUSHED AND THEN TURN OFF.

4. IN-PAVEMENT LIGHTS ARE ONLY REQUIRED IF THE ACTIVE VEHICLE BARRIER DOES NOT HAVE BARRIER LIGHTS. IF PROVIDED, THE LIGHTS ARE ONLY ON WHEN THE SIGNAL IS RED.

5. ACTIVE VEHICLE BARRIER LIGHTS ACTIVATE WHEN THE BARRIER IS NOT FULLY DOWN/CLOSED.

6. PROVIDE AT THE ID CHECK CANOPY. A MINIMUM OF ONE PER TWO LANES MOUNTED ON COLUMN NEAR ENTRANCE TO ID CHECK AREA. IT IS OPTIONAL TO HAVE ONE MOUNTED IN THE SEARCH AREA.

US Army Corps of Engineers®
OMAHA DISTRICT

MARK	DESCRIPTION	DATE	APPR.

MARK	DESCRIPTION	DATE	APPR.

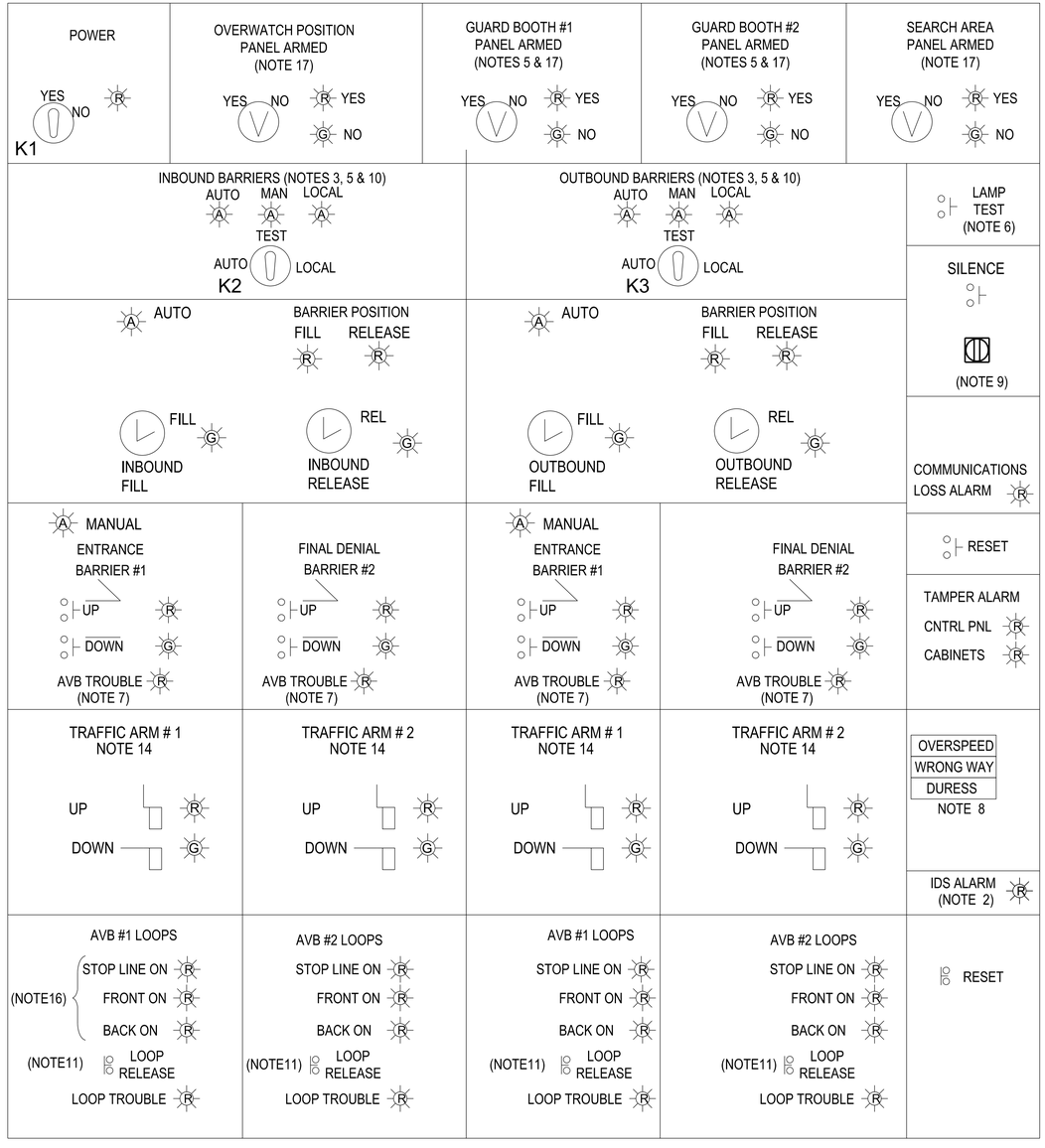
US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

DESIGNED BY: M.MCNAMARA		DATE: FEBRUARY 2021	
DWN BY: M.MCNAMARA	CKD BY: J.MCENCH	SOLICITATION NO.: Z	
SUBMITTED BY: S.LINDGREN		CONTRACT NO.: Z	
PLOT SCALE:	PLOT DATE:	FILE NUMBER: Z	
SIZE:	FILE NAME: E-132 STOP CTRL AVB CNTRL SEQUENCE.dgn		

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

STOP CONTROL -
CONTROL SEQUENCE AND DETAILS

SHEET IDENTIFICATION
E-132



COMMAND & CONTROL MASTER CONTROL OPERATING PANEL

BARRIER NORMALLY CLOSED SAFETY SYSTEM

NOT TO SCALE

LEGEND

- KX - KEY DESIGNATION WHERE X CORRESPONDS TO A NUMBER
- G - GREEN INDICATING LIGHT
- R - RED INDICATING LIGHT
- A - AMBER INDICATING LIGHT
- CONTROL SWITCHES
- SELECTOR SWITCH
- KEY OPERATED CONTROL SWITCH
- EFO SWITCH OR PUSH BUTTON WITH SAFETY COVER (MOMENTARY ACTION)
- BACK LIT WINDOW OR FLASHING RED INDICATOR

NOTES:

1. THE CONTROL PANEL LAYOUTS DEPICT AN ACCESS CONTROL POINT (ACP) WITH A GATEHOUSE, 2 GUARD BOOTHS, AN OVER WATCH POSITION, SEARCH AREA, AND 4 ACTIVE VEHICLE BARRIERS (AVB) (2 FOR INBOUND & 2 FOR OUTBOUND ENTRAPMENT). THE BARRIER LAYOUTS ARE NOTIONAL SINCE IT WILL VARY WITH EACH ACP AND AVB SYSTEM.

2. IF THE INSTALLATION HAS ITS OWN IDS AT THE LOCATION, THEN THE ALARM IS NOT REQUIRED.

3. THE BARRIER MODE SELECTOR SWITCHES SHALL BE KEY OPERATED WITH THE KEY REMOVABLE IN ALL MODES. EACH BARRIER AT AN ACP SHALL HAVE A UNIQUE KEY.

a. UNDER NORMAL OPERATIONS, THE BARRIER MODE SELECTOR SWITCHES WILL BE IN THEIR AUTO POSITIONS WITH KEYS REMOVED AND STORED IN A LOCKED CABINET IN THE GATEHOUSE ACCESSIBLE ONLY BY THE CHIEF OF THE GUARDS.
b. WHEN PERFORMING BARRIER MAINTENANCE, MAINTENANCE PERSONNEL WILL OBTAIN THE KEY FROM THE CHIEF OF THE GUARDS, PUT THE SWITCH IN THE "LOCAL" POSITION, AND THEN REMOVE AND RETAIN THE KEY. THE MAINTENANCE PERSON WILL THEN PUT THE KEY IN THE MODE SELECTOR SWITCH ON THE BARRIERS LOCAL CONTROL PANEL LOCATED AT THE BARRIER AND TURN THE KEY TO THE "LOCAL" POSITION TO ACTIVATE THE OPEN AND CLOSE SWITCHES ON THE LOCAL CONTROL PANEL. WHEN MAINTENANCE IS COMPLETE, THE MAINTENANCE PERSON WILL PLACE THE MODE SELECTOR SWITCH ON THE LOCAL CONTROL PANEL BACK TO "AUTO" MODE, REMOVE THE KEY, AND RETURN THE KEY TO THE CHIEF OF THE GUARDS. THE CHIEF OF THE GUARDS WILL USE THE KEY TO PLACE THE BARRIER'S MODE SELECTOR SWITCH ON THE MASTER CONTROL PANEL IN THE "AUTO" POSITION,AND THEN WILL REMOVE AND LOCKUP THE KEY.
c. A GUARD MAY TEST OPERATE A BARRIER BY FIRST OBTAINING THE BARRIER'S MODE SWITCH KEY FROM THE CHIEF OF THE GUARDS, PUTTING THE MODE SWITCH IN THE "MANUAL" POSITION, AND THEN OPENING OR CLOSING THE BARRIER WITH THE PUSHBUTTONS ON THE MASTER CONTROL PANEL. UPON COMPLETION OF THE TEST OPERATIONS, THE GUARD WILL RETURN MODE TO "EFO", REMOVE THE KEY, AND RETURN IT TO THE CHIEF OF THE GUARDS. PROCEDURES MUST BE IN PLACE TO ENSURE ALL OPERABLE BARRIERS' MODE SELECTOR SWITCHES ARE PLACED IN THE AUTO POSITIONS.

4. SEE UFGS 34 71 13.19 "CRASH RATED ACTIVE VEHICLE BARRIER AND CONTROLS APENDIX A "FULL CONTAINMENT SAFETY SYSTEM" FOR DESCRIPTIONS OF THE REQUIRED BARRIER AND TRAFFIC CONTROL SEQUENCES. THIS IS BASED ON SDDCTEA PAMPHLET 55-15, 2019.

5. LABEL FOR BARRIER AND GUARD BOOTH DESCRIPTION SHALL USE VERBIAGE TO HELP DESCRIBE THE LOCATION SUCH AS EAST AND WEST OR INBOUND & OUTBOUND

6. LAMP TEST PUSH BUTTON SHALL TURN ON ALL INDICATING LIGHTS WHILE BUTTON IS PUSHED WITHOUT EFFECTING ANY CONTROLS.

7. THE INDICATING LIGHT LABELED 'AVB TROUBLE' SHALL COME ON FOR ANY PROBLEM OR ALARM CONDITIONS AT THE BARRIER, e.g. LOW OIL AIR PRESSURE, LOW VOLTAGE, ETC.

8. OVERSPEED, WRONG- WAY, AND DURESS ALARMS AND CAN EITHER BE BACK LIT WINDOWS OR RED INDICATING LIGHTS. PROVIDE AN ADJUSTABLE AUDIBLE ALARM. ALARMS. DURESS ALARMS SHALL BE ON OVERWATCH POSITION PANEL AND COMMAND & CONTROL MASTER CONTROL PANEL ONLY. SILENCE ALARM SWITCH CAN BE USED TO SILENCE AUDIBLE ALARMS. ALL OVERSPEED AND WRONG WAY ALARMS SHALL BE SELF CLEARING. DURESS ALARM DOES NOT NEED TO BE MONITORED AT THE MASTER CONTROL PANEL IF DONE BY SOME OTHER PANEL.

9. AUDIBLE ALARM, ALARM SHALL HAVE A MEANS TO ADJUST THE VOLUME.

10. PANEL ORIENTATION AND LABELING SHALL MATCH THE WAY THE GUARD VIEWS THE BARRIERS AND GUARD BOOTHS.

11. LOOP SAFETY. WHEN THE PRESENCE DETECTION LOOPS IN FRONT OF AND BEHIND THE BARRIER ARE MORE THAN 10 FEET APART, A SAFETY CIRCUIT MUST BE ADDED TO ENSURE THAT THE BARRIER WILL NOT CLOSE (DEPLOY) ON A VEHICLE THAT IS OVER THE BARRIER BUT BETWEEN THE LOOPS SO IS NOT DETECTED BY EITHER LOOP. THE FOLLOWING ARE APPROVED CIRCUITS:

a. LATCHING CIRCUIT. WHEN A VEHICLE IS DETECTED BY LOOP 1, THE CONTROL LOGIC PICKS- UP AND SEALS ITSELF IN. AFTER THE VEHICLE PASSES OVER THE BARRIER IT SHOULD BE DETECTED BY LOOP 2 WHICH WILL DROP OUT RELAY FROM LOOP 1. LOOP RELEASE PUSH BUTTON IS REQUIRED RELAY LOOP 1 RELAY IN THE EVENT A VEHICLE IS DETECTED BY LOOP 1 BUT IS NOT DETECTED BY LOOP 2. IF THE VEHICLE PASSES OVER THE BARRIER BUT IS NOT DETECTED BY LOOP 2, THE LOOP 1 RELAY STAYS PICKED- UP EVEN THOUGH THERE IS NO VEHICLE OVER THE BARRIER. AFTER 15 SECONDS AT THIS CONDITION, AN ALARM SOUNDS TO ALERT THE GUARD THAT BARRIERS LOOP CIRCUIT IS LATCHED. THE GUARD MUST VISUALLY CHECK THE BARRIER AND IF THERE IS NOT A VEHICLE OVER IT, PUSH THE LOOP RELEASE TO DROP OUT THE RELAY AND CLEAR THE LOOP LATCH.
b. TIME DELAY CIRCUIT. AN ALTERNATIVE TO THE LOOP LATCH CIRCUIT AS DESCRIBED ABOVE IS A CIRCUIT USING A SHORT (0.5-1 SECOND) TIME DELAY. A VEHICLE PASSING OVER LOOP 1 PICKS UP A TIMER DELAY. AFTER THE VEHICLE CLEARS LOOP 1, THE TIMER EXTENDS THE 'ACTIVATION' OF LOOP 1 FOR THE TIME INDICATED. AFTER THE TIME EXPIRE, THEN LOOP 1 PER THE CONTROL LOGIC WILL LOOK LIKE IT IS CLEARED. THE ADDED TIME ALLOWS THE PASSING VEHICLE TO TRAVEL THE DISTANCE BETWEEN LOOP 1 AND 2 BEFORE THE TIME RUNS OUT. THE VEHICLE SHOULD BE DETECTED BY LOOP 2, WHICH WILL CONTINUE TO PREVENT BARRIER CLOSURE (DEPLOYMENT) UNTIL THE VEHICLE CLEARS LOOP 2.

12. PUSH BUTTON WITH A CORRESPONDING INDICATING LIGHT ARE ALLOWED TO BE COMBINED INTO ONE DEVICE.

13. PICTOGRAPHS SHOWING UP/DOWN (CLOSED/OPEN) ARE TO BE PROVIDED BY THE PUSH BUTTONS. CONTROLS PANELS SHOW A 'WEDGE' STYLE IN THIS EXAMPLE. PICTOGRAPH SHALL MATCH THE ACTUAL TYPE OF BARRIER.

14. SOME LOCATIONS REQUEST TRAFFIC ARMS AHEAD OF THE BARRIER. THIS IN AN ALLOWED OPTION. REVISE PANELS.

15. IT IS ALLOWED TO USE OPEN/CLOSE INSTEAD OF UP/DOWN.

16.INDICATING LIGHTS ACTIVATED WHEN A LOOP IS ACTIVATED.

17. ONE INDICATING LIGHT IS ALLOWED INSTEAD OF TWO INDICATING LIGHTS. CONFIGURATIONS WITH ONE LIGHT MUST BE RED AND ILLUMINATE WHEN SWITCH IS IN THE ARMED POSITION.

18. PLACE A PLACARD ON THE MASTER CONTROL PANEL WHICH STATES:
SPECIAL ALARMS:

MASTER AUTO MODE LOCAL IN LOCAL MODE	MASTER AUTO & LOCAL LIGHTS FLASHING
MASTER TEST MODE LOCAL IN LOCAL MODE	MASTER TEST & LOCAL LIGHTS FLASHING
RETURN TO AUTO MODE INCORRECT CONFIG.	AUTO MODE & AVB INDICATOR LIGHTS FLASH

STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGEMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS.

US Army Corps of Engineers
OMAHA DISTRICT

MARK	DESCRIPTION	DATE	APPR.

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DWN BY: M.MCNAMARA
CKD BY: J.MCENCH
SUBMITTED BY: S.LINDGREN
DATE: FEBRUARY 2021
SOLICITATION NO.: Z
CONTRACT NO.: Z
PLOT SCALE:
PLOT DATE:
FILE NUMBER: Z
SIZE:
FILE NAME: E-140 FULL CONTAINMENT AVB PANELS

US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

FULL CONTAINMENT
AVB CONTROL PANELS - MASTER

SHEET IDENTIFICATION
E-140
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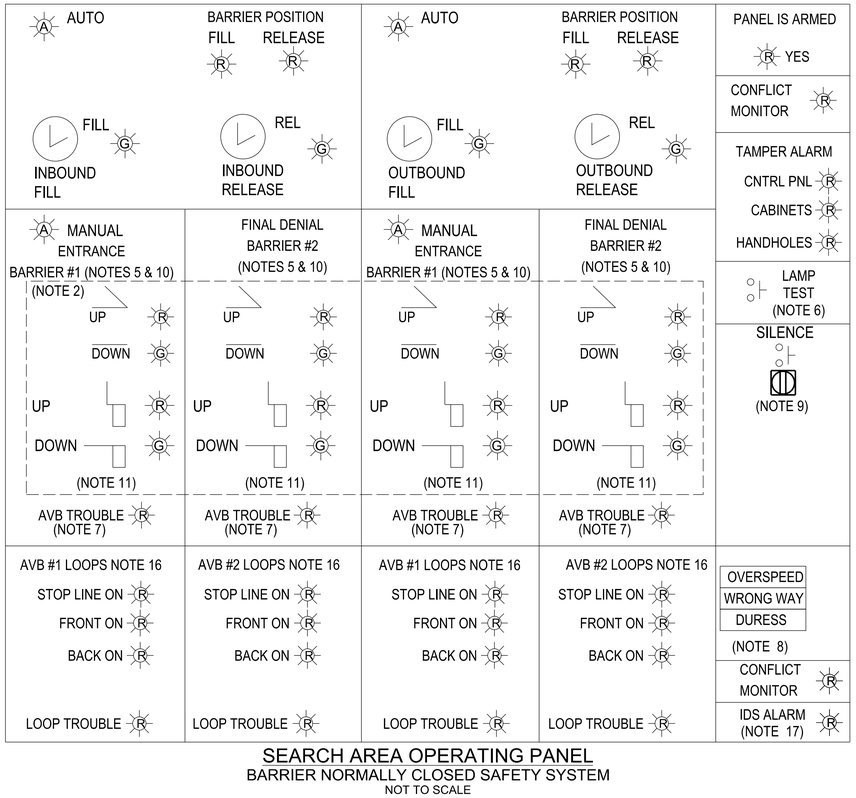

SEARCH AREA OPERATING PANEL
BARRIER NORMALLY CLOSED SAFETY SYSTEM
NOT TO SCALE

LEGEND

KX - KEY DESIGNATION WHERE X CORRESPONDS TO A NUMBER
G - GREEN INDICATING LIGHT
A - AMBER INDICATING LIGHT
R - RED INDICATING LIGHT
- CONTROL SWITCHES
- SELECTOR SWITCH
- KEY OPERATED CONTROL SWITCH
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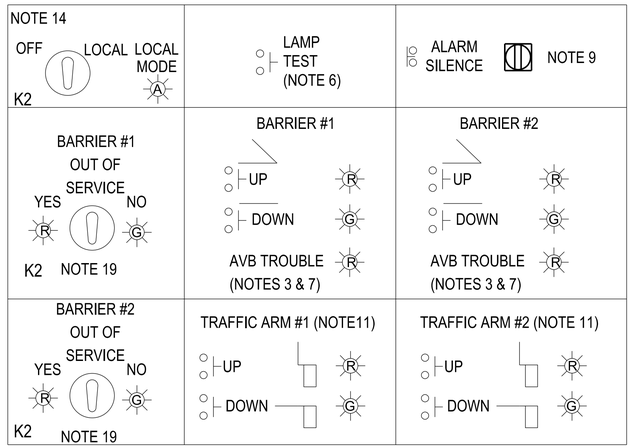
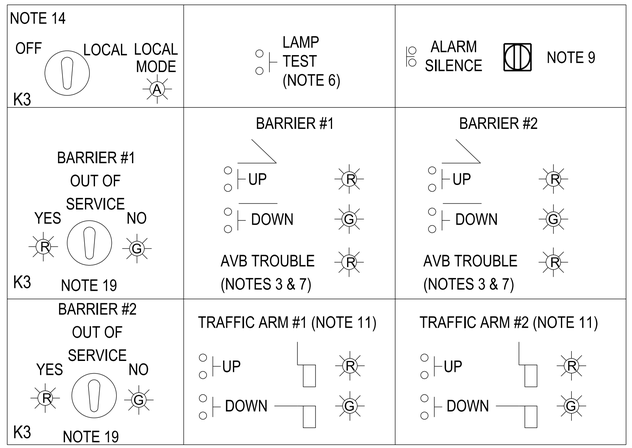


LOCAL CONTROL PANEL
AT INBOUND BARRIER
BARRIER NORMALLY CLOSED SAFETY SYSTEM
NOT TO SCALE



LOCAL CONTROL PANEL
AT OUTBOUND BARRIER
BARRIER NORMALLY CLOSED SAFETY SYSTEM
NOT TO SCALE

NOTES:

1. THE CONTROL PANEL LAYOUTS DEPICT AN ACCESS CONTROL POINT (ACP) WITH A GATEHOUSE, OVERWATCH, SEARCH AREA, AND 4 ACTIVE VEHICLE BARRIERS (2 FOR INBOUND & 2 FOR OUTBOUND ENTRAPMENT). THE BARRIER LAYOUTS ARE NOTIONAL SINCE IT WILL VARY WITH EACH ACP AND AVB SYSTEM.

2. BARRIER MODE AND STATUS INDICATING LIGHTS ARE OPTIONAL. PROVIDE AT REQUEST OF THE INSTALLATION.

3. NOT USED.

4. SEE UFGS 34 71 13.19 "CRASH RATED ACTIVE VEHICLE BARRIER AND CONTROLS" APPENDIX A "FULL CONTAINMENT SAFETY SYSTEM" FOR DESCRIPTIONS OF THE REQUIRED BARRIER AND TRAFFIC CONTROL SEQUENCES. THIS IS BASED ON SDDCTEA PAMPHLET 55-15, 2019.

5. LABEL FOR BARRIER AND GUARD BOOTH DESCRIPTION SHALL USE VERBIAGE TO HELP DESCRIBE THE LOCATION SUCH AS EAST AND WEST OR INBOUND & OUTBOUND

6. LAMP TEST PUSH BUTTON SHALL TURN ON ALL INDICATING LIGHTS WHILE BUTTON IS PUSHED WITHOUT EFFECTING ANY CONTROLS.

7. THE INDICATING LIGHT LABELED 'AVB TROUBLE' SHALL COME ON FOR ANY PROBLEM OR ALARM CONDITIONS AT THE BARRIER, e.g. LOW OIL AIR PRESSURE, LOW VOLTAGE, ETC.

8. OVERSPEED, WRONG- WAY, AND DURESS ALARMS AND CAN EITHER BE BACK LIT WINDOWS OR RED INDICATING LIGHTS. PROVIDE AN ADJUSTABLE AUDIBLE ALARM. ALARMS. DURESS ALARMS SHALL BE ON OVERWATCH POSITION PANEL AND COMMAND & CONTROL MASTER CONTROL PANEL ONLY. SILENCE ALARM SWITCH CAN BE USED TO SILENCE AUDIBLE ALARMS. ALL OVERSPEED AND WRONG WAY ALARMS SHALL BE SELF CLEARING. DURESS ALARM DOES NOT NEED TO BE MONITORED AT THE MASTER CONTROL PANEL IF DONE BY SOME OTHER PANEL.

9. AUDIBLE ALARM, ALARM SHALL HAVE A MEANS TO ADJUST THE VOLUME.

10. PANEL ORIENTATION AND LABELING SHALL MATCH THE WAY THE GUARD VIEWS THE BARRIERS.

11. SOME LOCATIONS REQUEST TRAFFIC ARMS AHEAD OF THE BARRIER. THIS IN AN ALLOWED OPTION. REVISE PANELS.

12. PUSH BUTTON WITH A CORRESPONDING INDICATING LIGHT ARE ALLOWED TO BE COMBINED INTO ONE DEVICE.

13. PICTOGRAPHS SHOWING UP/DOWN (CLOSED/OPEN) ARE TO BE PROVIDED BY THE PUSH BUTTONS. CONTROLS PANELS SHOW A 'WEDGE' STYLE IN THIS EXAMPLE. PICTOGRAPH SHALL MATCH THE ACTUAL TYPE OF BARRIER.

14. THE INBOUND AND OUTBOUND LOCAL PANELS CAN BE COMBINED INTO ONE PANEL IF THE LOCATION OF THE POWER UNITS ARE ADJACENT TO EACH OTHER.

15. IT IS ALLOWED TO USE OPEN/CLOSE INSTEAD OF UP/DOWN.

16. INDICATING LIGHTS ACTIVATED WHEN A LOOP IS ACTIVATED.

17. IF THE INSTALLATION HAS ITS OWN IDS AT THE LOCATION, THEN THE ALARM IS NOT REQUIRED.

18. PROVIDE AT THE ID CHECK CANOPY. A MINIMUM OF ONE PER TWO LANES MOUNTED ON COLUMN NEAR ENTRANCE TO ID CHECK AREA. IT IS OPTIONAL TO HAVE ONE MOUNTED IN THE SEARCH AREA.

19. OUT OF SERVICE SWITCH. THIS IS OPTIONAL FOR LAYOUTS THAT HAVE JUST ONE LANE PER DIRECTION OF TRAVEL. IF THERE ARE MULTIPLE LANES PER DIRECTION OF TRAVEL AND THEY ARE NOT SEPARATED BY AN ISLAND, THEN PROVIDE THIS SWITCH FOR EACH LANE. USED FOR LONG TERM MAINTENANCE WILL STILL ALLOWING THE OTHER LANES TO OPERATE NORMALLY.

PROVIDE 3"-4" HIGH RED LED LETTERING IN A WEATHERPROOF ENCLOSURE. THE WORDING 'OVERSPEED' OR 'WRONG WAY' SHALL ILLUMINATE INDEPENDENTLY. PROVIDE AN AUDIBLE DEVICE WITH A MEANS TO ADJUST THE VOLUME. SEE NOTE 18.

2 OVERSPEED & WRONG WAY WARNING ANNUNCIATOR
TY602GH NOT TO SCALE

STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGEMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS.

US Army Corps of Engineers®
OMAHA DISTRICT

MARK	DESCRIPTION	DATE	APPR.

MARK	DESCRIPTION	DATE	APPR.

US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

DESIGNED BY: M.MCNAMARA
DWN BY: M.MCNAMARA
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SUBMITTED BY: S.LINGREN
PLOT SCALE:
PLOT DATE:
SIZE:
DATE: FEBRUARY 2021
SOLICITATION NO.: Z
CONTRACT NO.: Z
FILE NUMBER: Z
FILE NAME: E-141 FULL CONTAINMENT AVB PANELS

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

FULL CONTAINMENT
AVB CONTROL PANELS - OTHER PANELS

SHEET IDENTIFICATION
E-141
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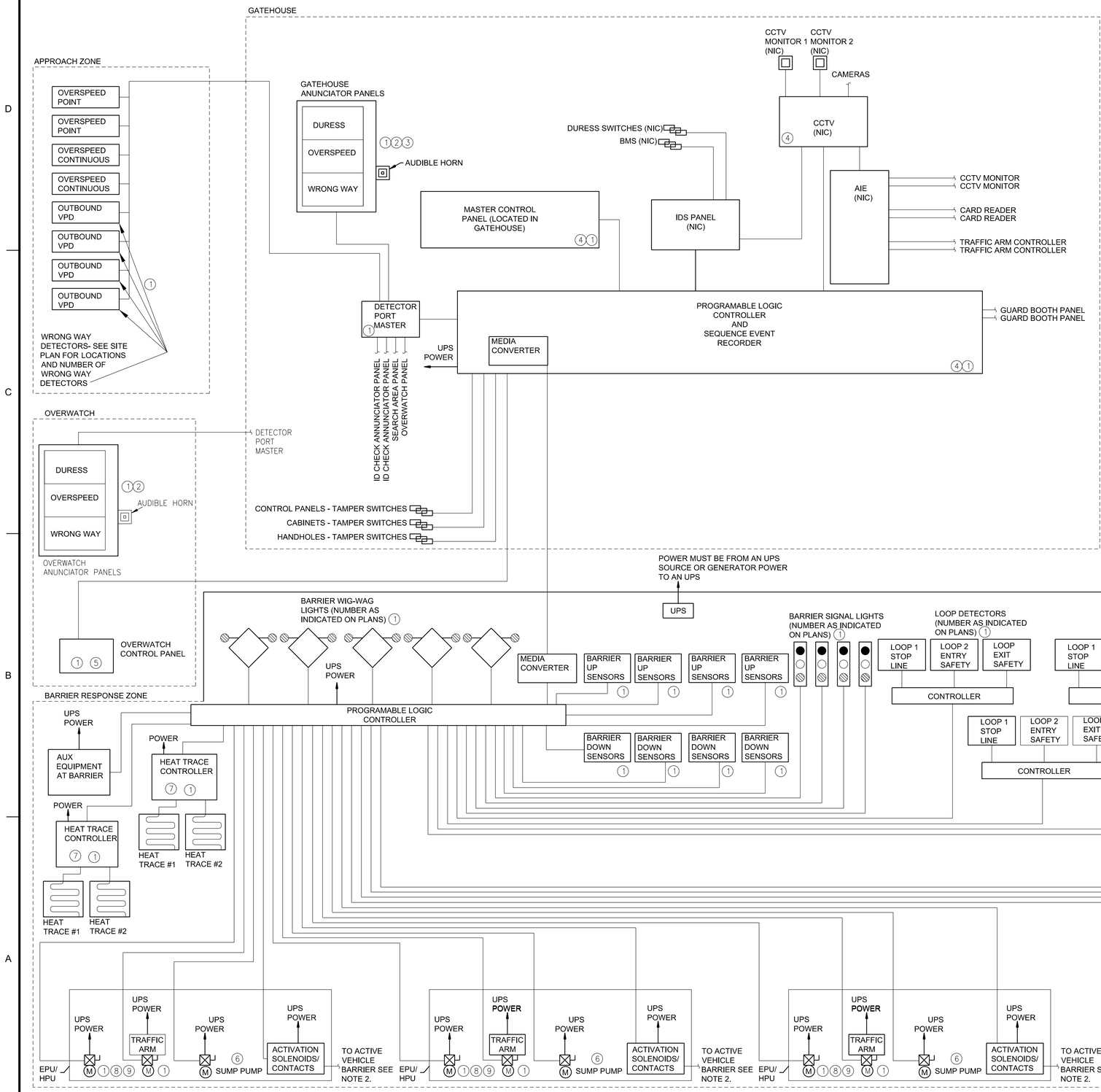


GENERAL NOTES

1. SEE SITE PLANS FOR RELATIVE EQUIPMENT LOCATIONS. COORDINATE EXACT LOCATIONS WITH END USER PRIOR TO INSTALLATION.

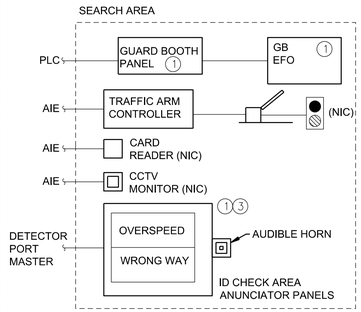
2. INSTALL ALL EQUIPMENT PER MANUFACTURERS REQUIREMENTS. PROVIDE ALL CONDUIT, CONDUCTORS, CABLING, AND ALL ELECTRICAL APPURTENANCES AS REQUIRED FOR A COMPLETE AND FUNCTIONAL INSTALLATION. THIS INCLUDES ANY CHANGES TO CONDUCTORS, CONDUITS, PANELBOARDS, UPS AND GENERATOR.

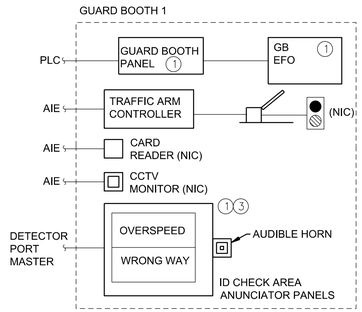
3. SEE SPECIFICATIONS 34 71 13.19 CRASH RATED ACTIVE VEHICLE BARRIERS AND CONTROLS FOR SPECIFIC REQUIREMENTS.

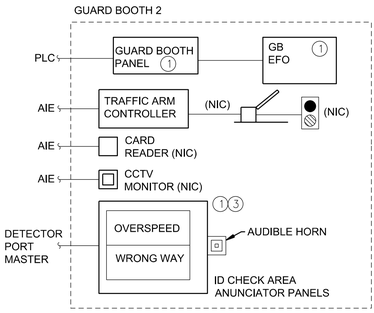
4. DIAGRAM IS FOR FOUR AVBS, TWO GUARDBOOTHS, AND AN OVERWATCH AND FIXED AIE. NOTE THAT GUARD BOOTHS ARE NOT TYPICAL FOR THIS SAFETY SCHEME. IF HANDHELD AIE THEN TRAFFIC ARM/SIGNALS, CARD READER, AND REAR TAG CAMERA ARE NOT PROVIDED BY AIE. PROVIDE TRAFFIC ARM/SIGNAL AS PART OF CONTRACT. DELETE DRIVER INTERFACE CARD READER. PROVIDE CONDUIT FOR REAR TAG CAMERA.

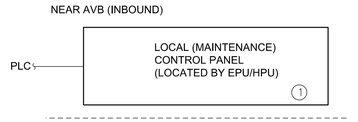
CONSTRUCTION NOTES

1. PROVIDE DEVICE AND ALL POWER AND CONTROL CONNECTIONS AS REQUIRED.
2. ANNUNCIATOR PANEL WITH AUDIBLE ALARM AND BACKLIT "WRONG WAY" & "DURESS" DISPLAY.
3. CAN BE PART OF MASTER CONTROL PANEL INSTEAD OF SEPARATE PANEL.
4. PROVIDE A DRY CONTACT FOR CCTV CAMERA CONNECTION.
5. PROVIDE A 20' CABLE FOR PANEL PORTABILITY IF AN OVERWATCH PAD INSTEAD OF A BOOTH. PROVIDE ALL CONNECTIONS AND APPURTENANCES AS REQUIRED.
6. OVERWATCH PANEL CAN BE IN A BUILDING OR AT A PAVED PAD. IF AT PAVED PAD PROVIDE CABLE AND CABINET. CABINET IS TO BE LARGE ENOUGHT TO PUT CONTROL PANEL IN IT.
7. BARRIER HEAT TAPE.
8. BARRIER EPU OR HPU. IF HPU MOTOR DOES NOT NEED UPS.
9. EPU'S SHALL BE PROVIDED WITH AN UPS THAT MATCHES THE MOTOR & MOTOR CONTROLLER CHARACTERISTICS.









US Army Corps of Engineers
OMAHA DISTRICT

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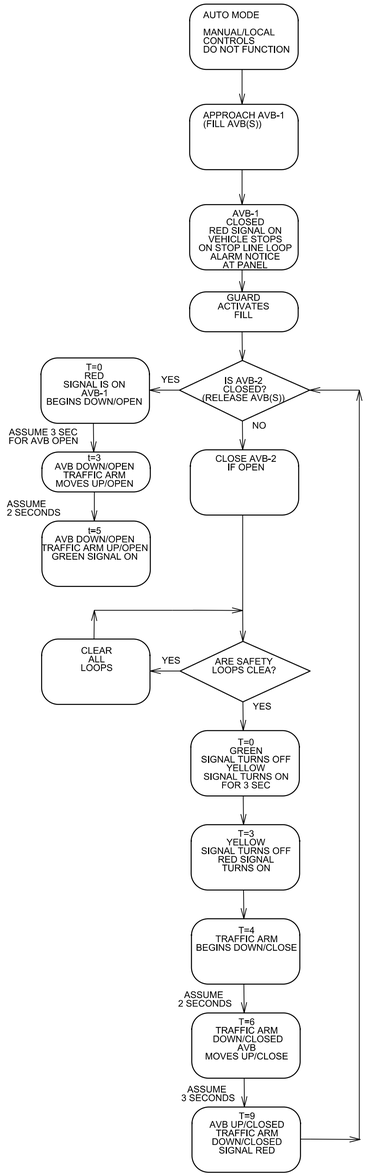
DESIGNED BY: M.MCNAMARA
DRN BY: M.MCNAMARA
CKD BY: J.MOENCH
SUBMITTED BY: S.LUNDGREN
DATE: FEBRUARY 2021
SOLICITATION NO.: Z
CONTRACT NO.: Z
PLOT DATE:
PLOT SCALE:
FILE NUMBER: Z
SIZE:
FILE NAME: E-142 FULL CONTAINMENT AVB CONTROL SYS DIAGRAM

US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

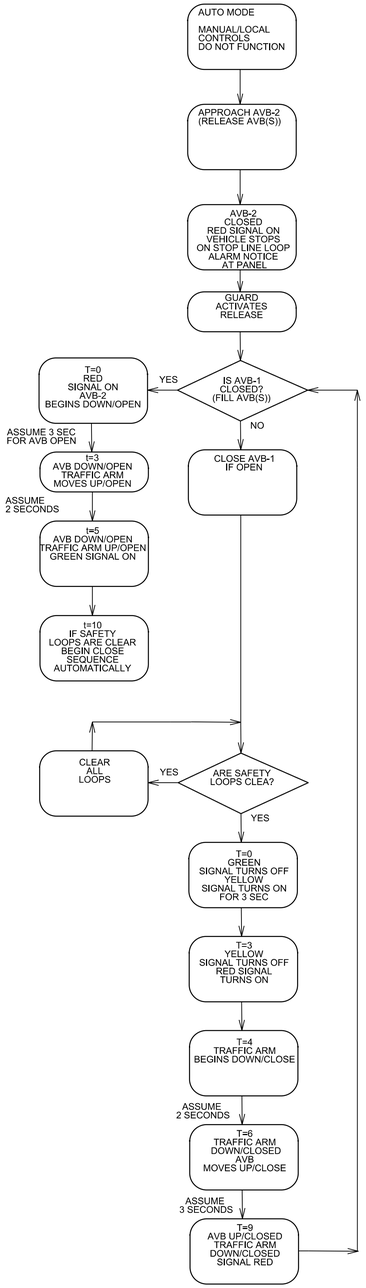
VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

FULL CONTAINMENT CONTROL SYSTEM DIAGRAM

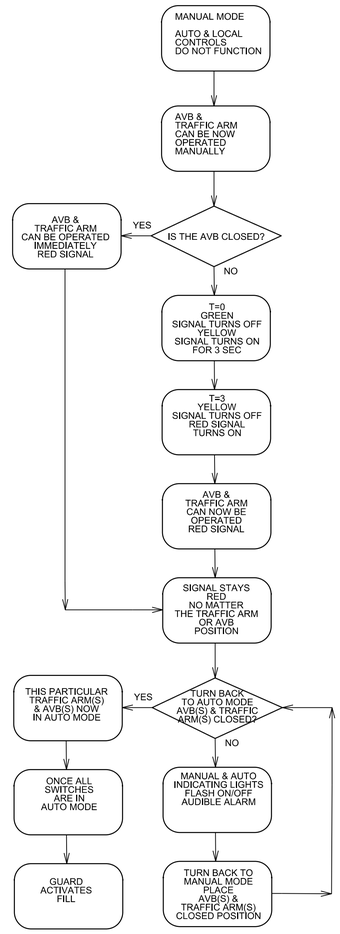
SHEET IDENTIFICATION
E-142



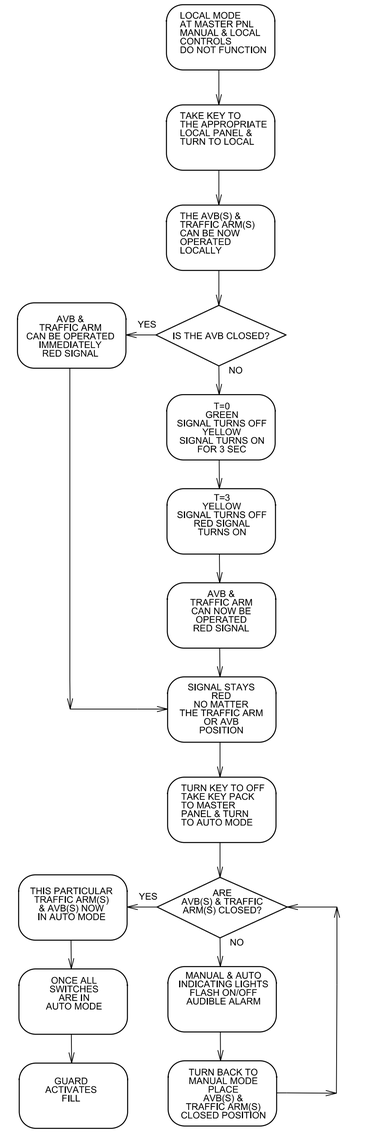
1 XXXX NOT TO SCALE — AUTO MODE - FILL WITH TRAFFIC ARM



2 XXXX NOT TO SCALE — AUTO MODE - EXIT/RELEASE WITH TRAFFIC ARM



3 XXXX NOT TO SCALE — TEST MODE - APPLY TO EACH TEST MODE SWITCH



4 XXXX NOT TO SCALE — LOCA MODE - APPLY TO EACH LOCAL PANEL

US Army Corps of Engineers®
OMAHA DISTRICT

	DESCRIPTION	DATE	APPR.

	DESCRIPTION	DATE	APPR.

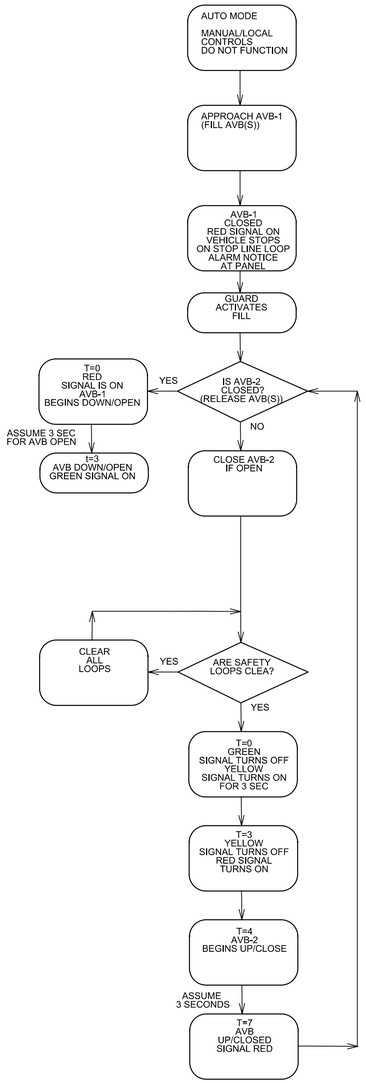
DESIGNED BY: M.MCNAMARA
DRWN BY: M.MCNAMARA
CKD BY: J.MCENCH
SUBMITTED BY: S.LINDGREN
DATE: FEBRUARY 2021
SOLICITATION NO.: Z
CONTRACT NO.: Z
FILE NUMBER: Z
PLOT DATE:
PLOT SCALE:
SIZE:
FILE NAME: E-112 HEPD AVB CTRL SEQUENCE AND DETAILS.DWG

US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

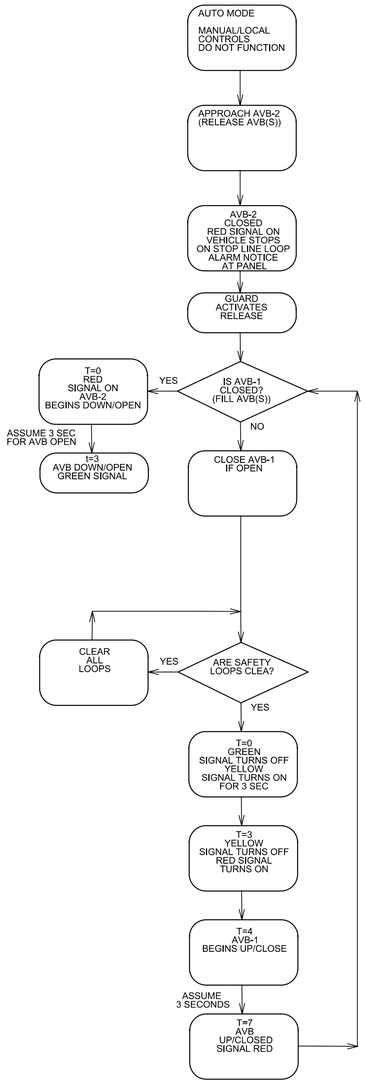
VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

FULL CONTAINMENT CONTROL SYSTEM DIAGRAMS W/ TRAFFIC ARMS

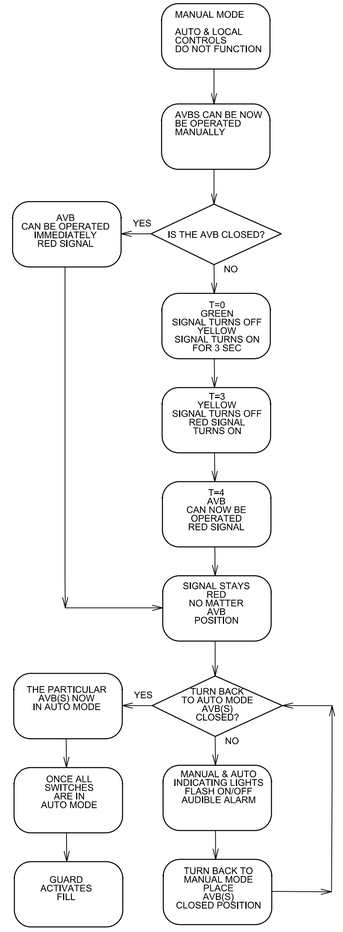
SHEET IDENTIFICATION
E-143



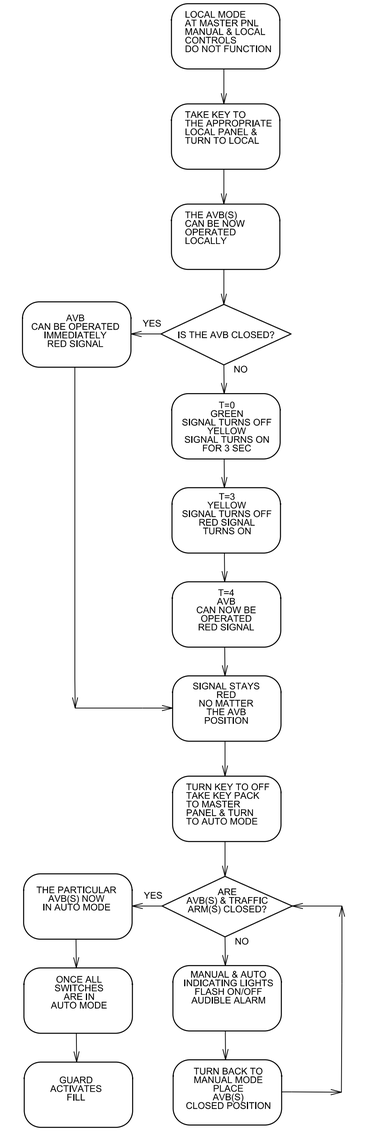
1 XXXX NOT TO SCALE — AUTO MODE - FILL WITHOUT TRAFFIC ARM



2 XXXX NOT TO SCALE — AUTO MODE - EXIT/RELEASE WITHOUT TRAFFIC ARM



3 XXXX NOT TO SCALE — TEST MODE - APPLY TO EACH TEST MODE SWITCH



4 XXXX NOT TO SCALE — LOCA MODE - APPLY TO EACH LOCAL PANEL

US Army Corps of Engineers®
OMAHA DISTRICT

NO.	DESCRIPTION	DATE	APPR.

NO.	DESCRIPTION	DATE	APPR.

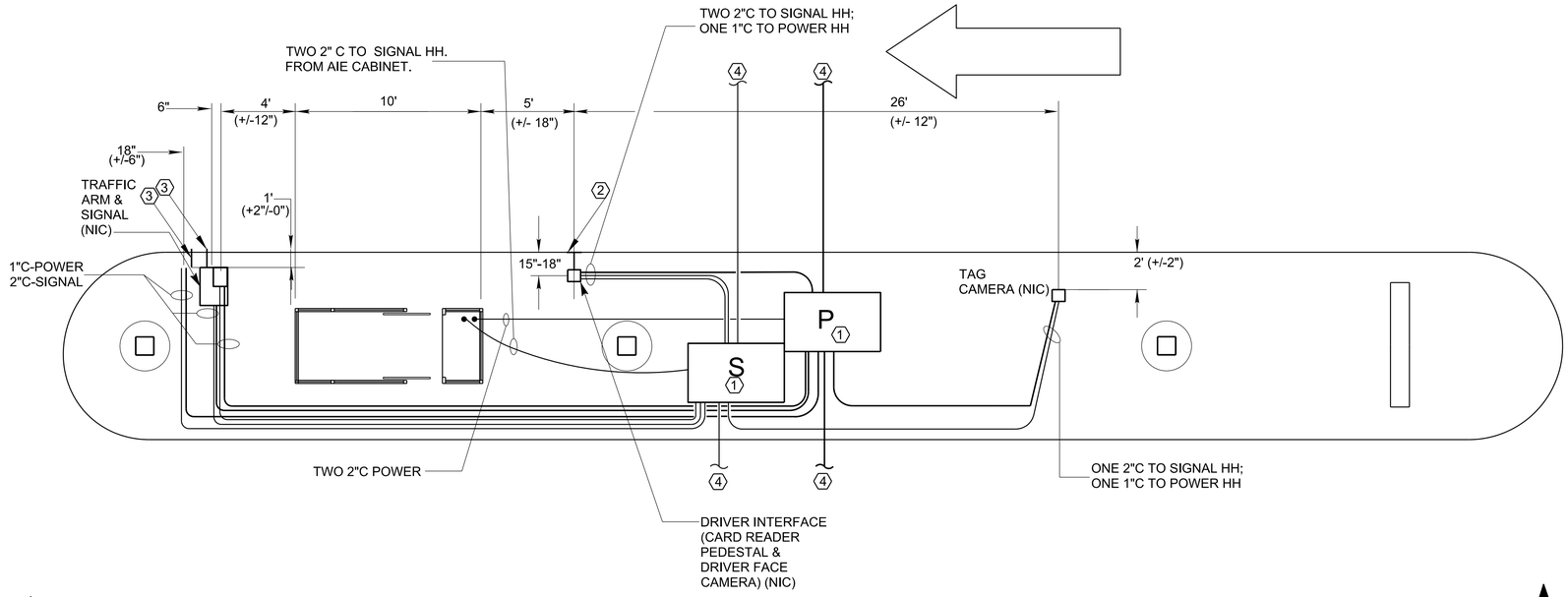
DESIGNED BY: M.MCNAMARA
DWN BY: M.MCNAMARA
CKD BY: J.MCENCH
SUBMITTED BY: S.LINDGREN
DATE: FEBRUARY 2021
SOLICITATION NO.: Z
CONTRACT NO.: Z
FILE NUMBER: Z
PLOT DATE:
PLOT SCALE:
SIZE:
FILE NAME: E-112 HEPD AVB CTRL SEQUENCE AND DETAILS.DWG

US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

FULL CONTAINMENT CONTROL SYSTEM DIAGRAMS W/O TRAFFIC ARMS

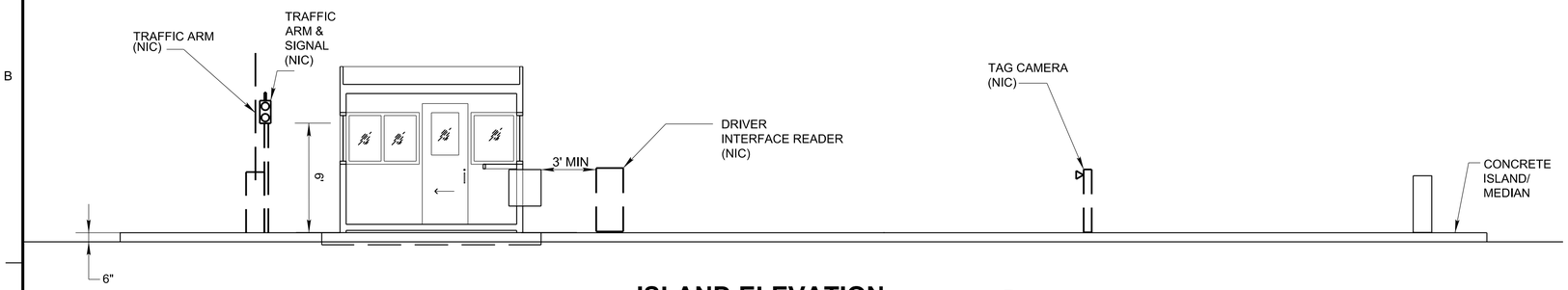
SHEET IDENTIFICATION
E-144



ISLAND TYPICAL PLAN

1

SCALE: 1/4" = 1'-0"

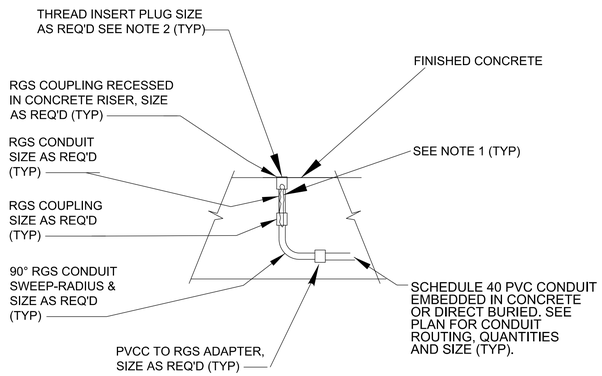


ISLAND ELEVATION

A

4' 2' 0 4'

SCALE: 1/4" = 1'-0"



NOTES:

1. PULL STRING SHALL BE PROVIDED AND INSTALLED INSIDE CONDUIT. EXCESS PULL STRING SHALL BE COILED NEAR PLUG FOR USE.

2. INSTALL CONDUIT PLUG PRIOR TO ENCASING CONDUIT IN CONCRETE.

TYPICAL EMBEDDED CONDUIT STUB UP DETAIL

2

NOT TO SCALE

KEYED NOTES:

1. P IS FOR POWER (600V OR LESS) HANDHOLE. S IS FOR SIGNAL (CONTROL CABLES) HANDHOLE. SUGGESTED SIZE FOR EACH IS 36" X 60" X 36"D. THE SIGNAL HANDHOLE MUST HAVE A SOLID BOTTOM.

2. 3/4" C FOR LOOP DETECTORS. (NIC) CONDUIT SHALL BE PLACED 1" BELOW SURFACE OF ROAD AND EXTEND OUT A DISTANCE OF 12" FROM CURB FACE..

3. 3/4" C FOR LOOP DETECTORS. (NIC) CONDUIT SHALL BE PLACED 1" BELOW SURFACE OF ROAD AND EXTEND OUT A DISTANCE OF 12" FROM CURB FACE.

4. CONDUIT REQUIREMENTS FOR AIE ONLY WHEN GOING FROM GATEHOUSE/HUT OR OTHER LOCATION TO FIRST HANDHOLE AND THEN BETWEEN ISLANDS:
POWER: TWO 2"C; SIGNAL ONE 4"C.

GENERAL NOTES

1. PLAN IS FOR NEW CONSTRUCTION. THE PLAN SHOWS PLACEMENT OF CONDUITS REQUIRED FOR AUTOMATED INSTALLATION ENTRY (AIE) EQUIPMENT. DETAIL 2 SHOWS SUGGESTED METHOD OF CONDUIT PLACEMENT IN THE CONCRETE, BUT OTHER METHODS ARE ALLOWED.

2. PROVIDE NO MORE THAN 1" SPACING BETWEEN CONDUITS.

3. CONDUIT STUB-UPS TO A DEVICE OR EQUIPMENT SHALL BE GROUPED TO HAVE A MAXIMUM OF 1" SEPARATION.

4. NIC IS NOT IN CONTRACT.

5. CONDUIT AND CAMERAS ARE TO BE INSTALLED IN CONCRETE.

6. AT LEAST 3' IS REQUIRED TO BE MAINTAINED AROUND THE GUARD BOOTH. THIS INCLUDES ENSURING THE DISTANCE IS MAINTAINED FROM THE GUARD BOOTH MECHANICAL UNIT, WHEN IT IS NOT ROOF MOUNTED.

7. TRAFFIC ARM AND TRAFFIC ARM SIGNAL ARE SHOWN COMBINED; HOWEVER THE TRAFFIC ARM AND TRAFFIC ARM SIGNAL CAN BE SEPARATED PIECES OF EQUIPMENT.

8. FOR REFERENCE, THE AIE CABINET LOCATED AT THE GATEHOUSE/HUT OR OTHER LOCATION IS TYPICALLY A 45U: 78"H X 29"W X 42"D.

STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGEMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS.

US Army Corps of Engineers
OMAHA DISTRICT

MARK	DESCRIPTION	DATE	APPR.
MARK	DESCRIPTION	DATE	APPR.

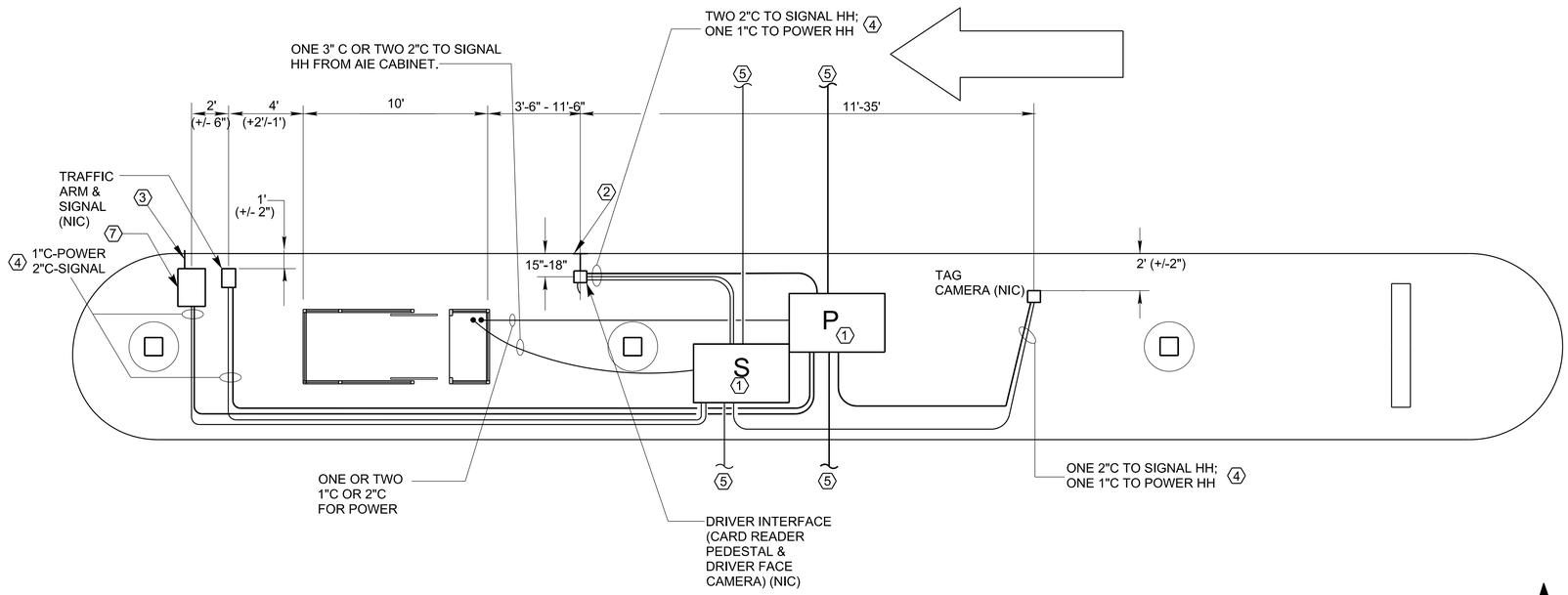
DESIGNED BY: M.MCNAMARA
DWN BY: M.MCNAMARA
CKD BY: J.MOENCH
SUBMITTED BY: S.LINDGREN
PLOT SCALE:
PLOT DATE:
SIZE:
DATE: FEBRUARY 2021
SOLICITATION NO.: Z
CONTRACT NO.: Z
FILE NUMBER: Z
FILE NAME: E-150 NEW ISLAND TYP PLAN & ELEV.dgn

US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

NEW ISLAND TYPICAL PLAN & ELEVATION FOR AIE

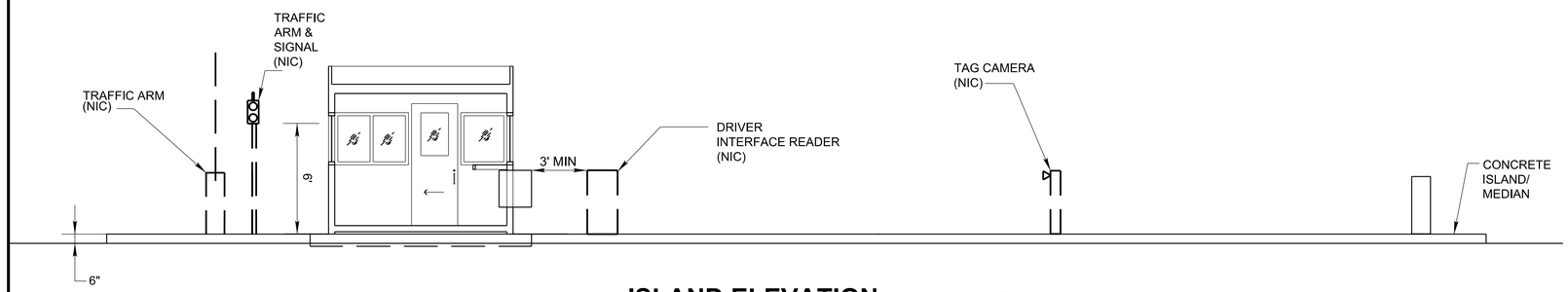
SHEET IDENTIFICATION
E-150
00



ISLAND TYPICAL PLAN

1

SCALE: 1/4" = 1'-0"



ISLAND ELEVATION

A

4' 2' 0 4'

SCALE: 1/4" = 1'-0"

KEYED NOTES:

1. P IS FOR POWER (600V OR LESS) HANDHOLE. S IS FOR SIGNAL (CONTROL CABLES) HANDHOLE.

2. 3/4" C FOR LOOP DETECTORS. (NIC) CONDUIT SHALL BE PLACED 1" BELOW SURFACE OF ROAD AND EXTEND OUT A DISTANCE OF 12" FROM CURB FACE..

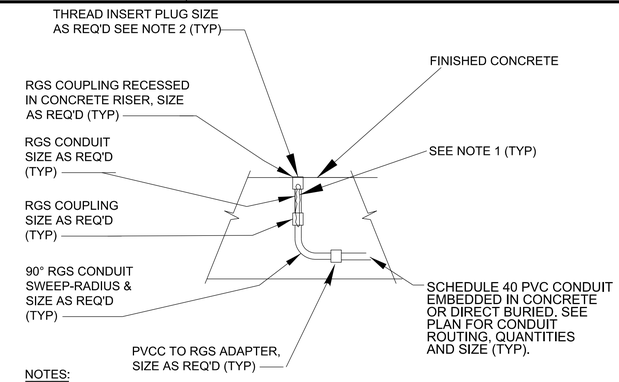
3. 3/4" C FOR LOOP DETECTORS. (NIC) CONDUIT SHALL BE PLACED 1" BELOW SURFACE OF ROAD AND EXTEND OUT A DISTANCE OF 12" FROM CURB FACE.

4. EXISTING INFRASTRUCTURE IS ALLOWED TO HAVE 1"C FOR THE SIGNAL. NEED AT LEAST ONE CONDUIT FOR POWER AND ONE FOR SIGNAL.

5. CONDUIT REQUIREMENTS FOR AIE ONLY WHEN GOING FROM GATHOUSE/HUT OR OTHER LOCATION TO FIRST HANDHOLE AND THEN BETWEEN ISLANDS:
POWER: ONE 4"C OR TWO 2"C; SIGNAL ONE 4"C.

KEYED NOTES CONTINUED:

6. IF THE TRAFFIC ARM AND TRAFFIC ARM SIGNAL ARE ALL COLLOCATED, THEN ONLY A 2" SIGNAL AND 1" POWER IS REQUIRED.



NOTES:

1. PULL STRING SHALL BE PROVIDED AND INSTALLED INSIDE CONDUIT. EXCESS PULL STRING SHALL BE COILED NEAR PLUG FOR USE.

2. INSTALL CONDUIT PLUG PRIOR TO ENCASING CONDUIT IN CONCRETE.

TYPICAL EMBEDDED CONDUIT STUB UP DETAIL

2

NOT TO SCALE

GENERAL NOTES

1. PLAN IS FOR EXISTING INFRASTRUCTURE I.E. EXISTING CONDUIT LAYOUT OR ISLANDS. THE PLAN SHOWS PLACEMENT OF CONDUITS FOR AUTOMATED INSTALLATION ENTRY (AIE) EQUIPMENT. DETAIL 2 SHOWS SUGGESTED METHOD OF CONDUIT PLACEMENT IN THE CONCRETE, BUT OTHER METHODS ARE ALLOWED.

2. PROVIDE NO MORE THAN 1" SPACING BETWEEN CONDUITS.

3. CONDUIT STUB-UPS TO A DEVICE OR EQUIPMENT SHALL BE GROUPED TO HAVE A MAXIMUM OF 1" SEPARATION.

4. NIC IS NOT IN CONTRACT.

5. CONDUIT AND CAMERAS ARE TO BE INSTALLED IN CONCRETE.

6. AT LEAST 3' IS REQUIRED TO BE MAINTAINED AROUND THE GUARD BOOTH. THIS INCLUDES ENSURING THE DISTANCE IS MAINTAINED FROM THE GUARD BOOTH MECHANICAL UNIT.

7. TRAFFIC ARM AND TRAFFIC ARM SIGNAL ARE SHOWN SEPARATE; HOWEVER, THE TRAFFIC ARM AND TRAFFIC ARM SIGNAL COULD BE CO-LOCATED. IF CO-LOCATED AND THERE ARE EXISTING CONDUITS AS SHOWN FOR THE TRAFFIC ARM, THEN, IT IS SUGGESTED, THAT A SMALL HANDHOLE (APPROX 12" SQUARE) BE PLACED AROUND THE EXISTING CONDUITS. THEN SAW CUT IN NEW CONDUITS TO WITHIN 6 INCHES OF THE TRAFFIC ARM SIGNAL LOCATION. THIS ALLOWS THE USE OF THE EXISTING CONDUITS WITH MINIMAL IMPACT ON THE ISLAND.

8. EXISTING ISLANDS THAT ARE TOO SHORT TO FIT THE REAR TAG CAMERA ON THE ISLAND/MEDIAN AT THE MINIMUM DIMENSION WILL BE REVIEWED ON A CASE BY CASE BASIS. PROVIDE INFORMATION ON A PROPOSED LOCATION. THE CAMERA IS TO BE PROTECTED FROM ERRANT VEHICLE IMPACT ACCORDING TO AASHTO ROADSIDE DESIGN GUIDE.

9. FOR REFERENCE, THE AIE CABINET LOCATED AT THE GATEHOUSE/HUT OR OTHER LOCATION IS TYPICALLY A 45U: 78"H X 29"W X 42"D.

10. GUARD BOOTH IS SHOWN TO BE 10' L X 4' W. IF THE BOOTH IS SHORTER THAN 10' THEN WHERE POSSIBLE ENSURE THE CONDUIT PLACEMENT WILL WORK IN THE FUTURE FOR A 10 FT GUARD BOOTH. TYPICALLY ADJUST THE THE TRAFFIC ARM SIGNAL AND TRAFFIC ARM CONDUIT PLACEMENT FOR A 10 FT BOOTH BEING INSTALLED IN THE FUTURE.

STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGEMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS.

US Army Corps of Engineers
OMAHA DISTRICT

MARK	DESCRIPTION	DATE	APPR.
MARK	DESCRIPTION	DATE	APPR.

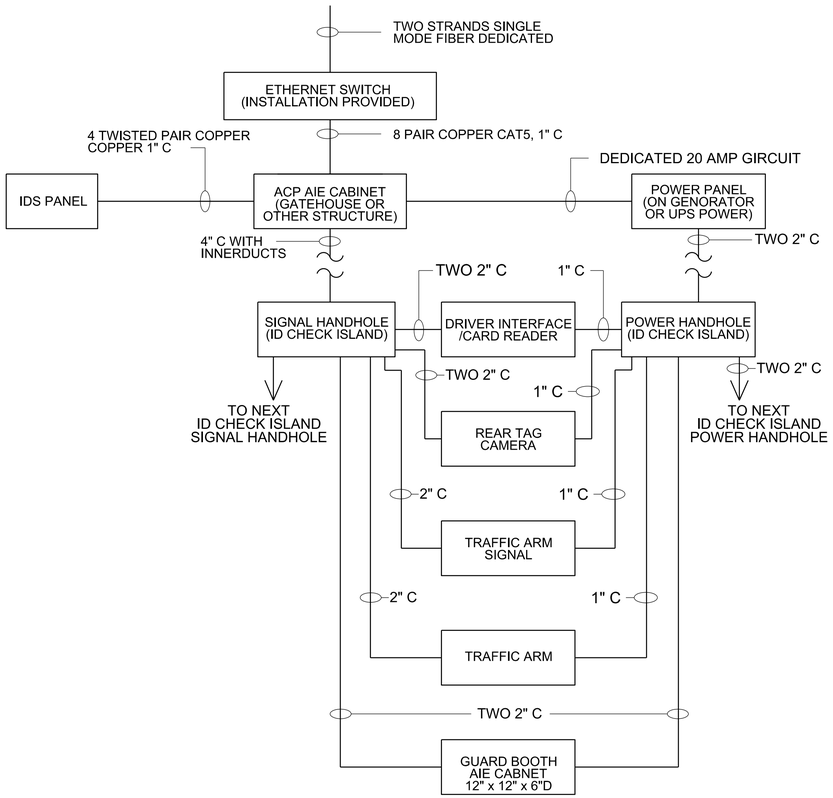
DESIGNED BY: M.MCNAMARA
DWN BY: M.MCNAMARA
CKD BY: J.MOENCH
SUBMITTED BY: S.LINDGREN
PLOT SCALE:
PLOT DATE:
SIZE:
DATE: FEBRUARY 2021
SOLICITATION NO.: Z
CONTRACT NO.: Z
FILE NUMBER: Z
FILE NAME: E-151 EXIST ISLAND TYP PLAN & ELEV.dgn

US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

EXISTING ISLAND TYPICAL PLAN & ELEVATION

SHEET IDENTIFICATION
E-151
00



STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGEMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS.

US Army Corps of Engineers®
OMAHA DISTRICT

MARK	DESCRIPTION	DATE	APPR.

MARK	DESCRIPTION	DATE	APPR.

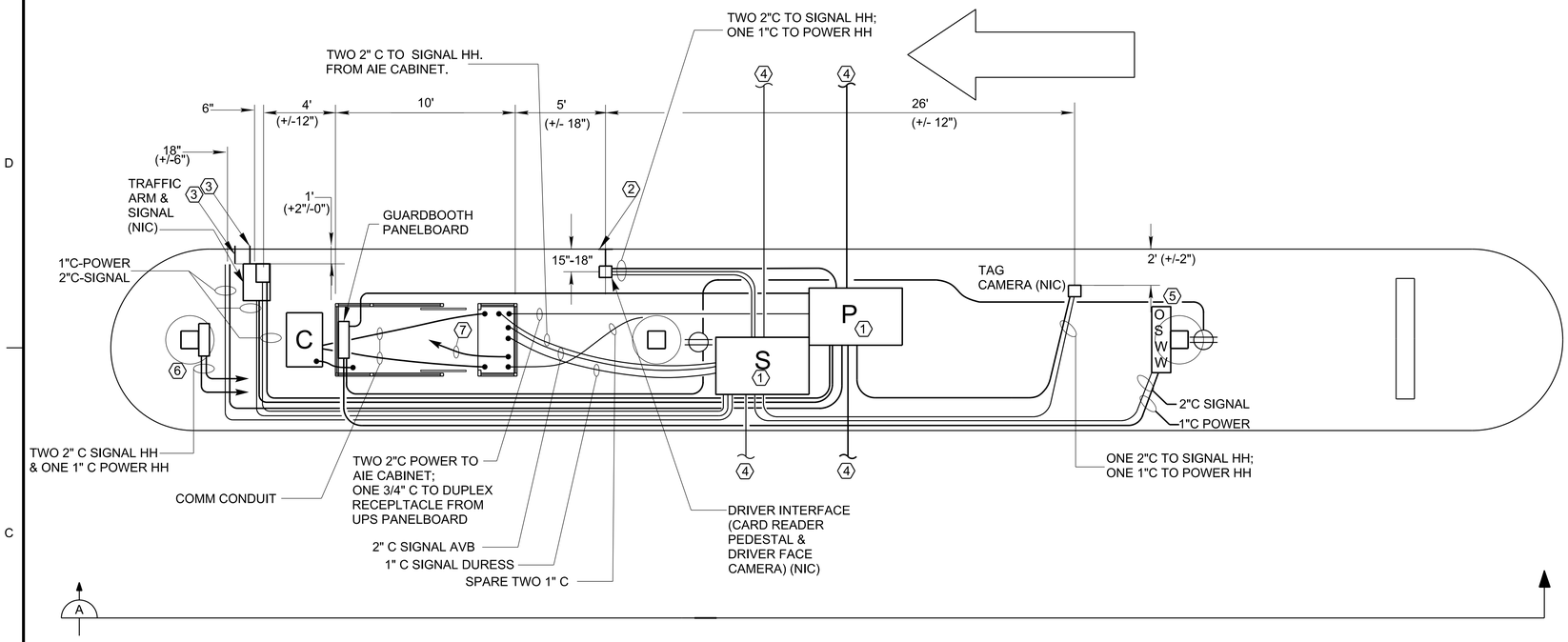
US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

DESIGNED BY: M.MCNAMARA
DWN BY: M.MCNAMARA
CKD BY: J.MOENCH
SUBMITTED BY: S.LINDGREN
PLOT SCALE:
PLOT DATE:
DATE: FEBRUARY 2021
SOLICITATION NO.: Z
CONTRACT NO.: Z
FILE NUMBER: Z
SIZE:
FILE NAME: E-152 AIE FIXED BLOCK

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

FIXED AIE BLOCK DIAGRAM

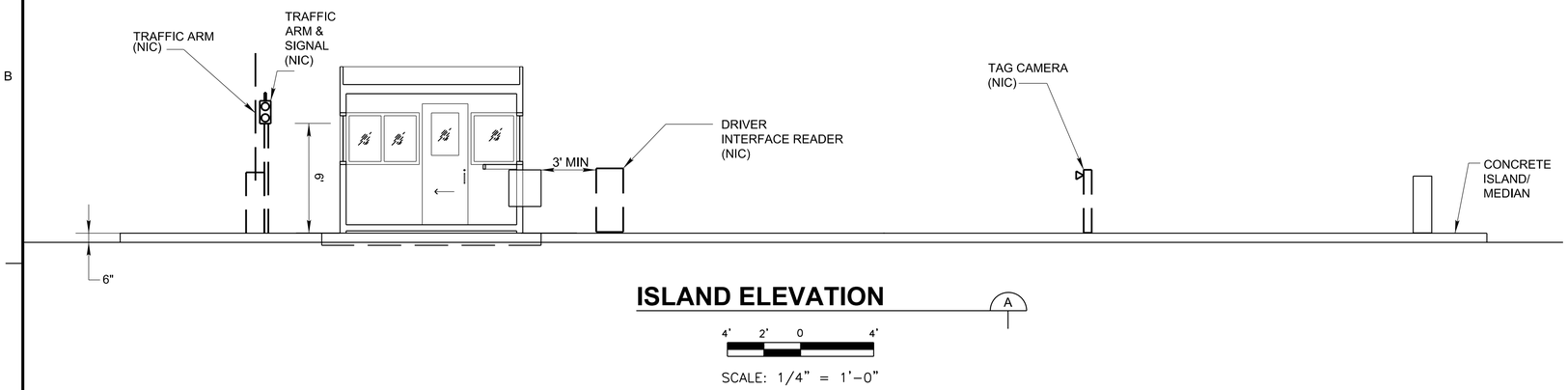
SHEET IDENTIFICATION
E-152
00



ISLAND TYPICAL PLAN

1

SCALE: 1/4" = 1'-0"

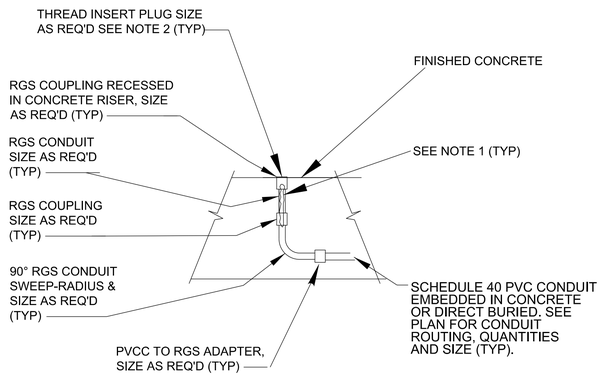


ISLAND ELEVATION

A

4' 2' 0 4'

SCALE: 1/4" = 1'-0"



NOTES:

1. PULL STRING SHALL BE PROVIDED AND INSTALLED INSIDE CONDUIT. EXCESS PULL STRING SHALL BE COILED NEAR PLUG FOR USE.

2. INSTALL CONDUIT PLUG PRIOR TO ENCASING CONDUIT IN CONCRETE.

TYPICAL EMBEDDED CONDUIT STUB UP DETAIL

2

NOT TO SCALE

KEYED NOTES:

1. P IS FOR POWER (600V OR LESS) HANDHOLE. S IS FOR SIGNAL (CONTROL CABLES) HANDHOLE. SUGGESTED SIZE FOR EACH IS 36" X 60" X 36"D. THE SIGNAL HANDHOLE MUST HAVE A SOLID BOTTOM.

2. 3/4" C FOR LOOP DETECTORS. (NIC) CONDUIT SHALL BE PLACED 1" BELOW SURFACE OF ROAD AND EXTEND OUT A DISTANCE OF 12" FROM CURB FACE..

3. 3/4" C FOR LOOP DETECTORS. (NIC) CONDUIT SHALL BE PLACED 1" BELOW SURFACE OF ROAD AND EXTEND OUT A DISTANCE OF 12" FROM CURB FACE.

4. CONDUIT REQUIREMENTS FOR AIE ONLY WHEN GOING FROM GATEHOUSE/HUT OR OTHER LOCATION TO FIRST HANDHOLE AND THEN BETWEEN ISLANDS:
POWER: TWO 2"C; SIGNAL ONE 4"C.

5. OVER SPEED & WRONG-WAY ANNUNCIATOR ALARM PANEL. PROVIDE A HORN WITH ADJUSTABLE VOLUME CONTROL.

6. CCTV CAMERA CABINET.

7. GROUND BOTH TRAFFIC CONTROL PANEL. RUN CIRCUIT TO LANE OPEN/CLOSE LIGHT.

GENERAL NOTES

1. PLAN IS FOR NEW CONSTRUCTION. THE PLAN SHOWS PLACEMENT OF CONDUITS REQUIRED FOR AUTOMATED INSTALLATION ENTRY (AIE) EQUIPMENT. DETAIL 2 SHOWS SUGGESTED METHOD OF CONDUIT PLACEMENT IN THE CONCRETE, BUT OTHER METHODS ARE ALLOWED.

2. PROVIDE NO MORE THAN 1" SPACING BETWEEN CONDUITS.

3. CONDUIT STUB-UPS TO A DEVICE OR EQUIPMENT SHALL BE GROUPED TO HAVE A MAXIMUM OF 1" SEPARATION.

4. NIC IS NOT IN CONTRACT.

5. CONDUIT AND CAMERAS ARE TO BE INSTALLED IN CONCRETE.

6. AT LEAST 3' IS REQUIRED TO BE MAINTAINED AROUND THE GUARD BOOTH. THIS INCLUDES ENSURING THE DISTANCE IS MAINTAINED FROM THE GUARD BOOTH MECHANICAL UNIT, WHEN IT IS NOT ROOF MOUNTED.

7. TRAFFIC ARM AND TRAFFIC ARM SIGNAL ARE SHOWN COMBINED; HOWEVER THE TRAFFIC ARM AND TRAFFIC ARM SIGNAL CAN BE SEPARATED PIECES OF EQUIPMENT.

8. FOR REFERENCE, THE AIE CABINET LOCATED AT THE GATEHOUSE/HUT OR OTHER LOCATION IS TYPICALLY A 45U: 78"H X 29"W X 42"D.

STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGEMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS.

US Army Corps of Engineers
OMAHA DISTRICT

MARK	DESCRIPTION	DATE	APPR.

MARK	DESCRIPTION	DATE	APPR.

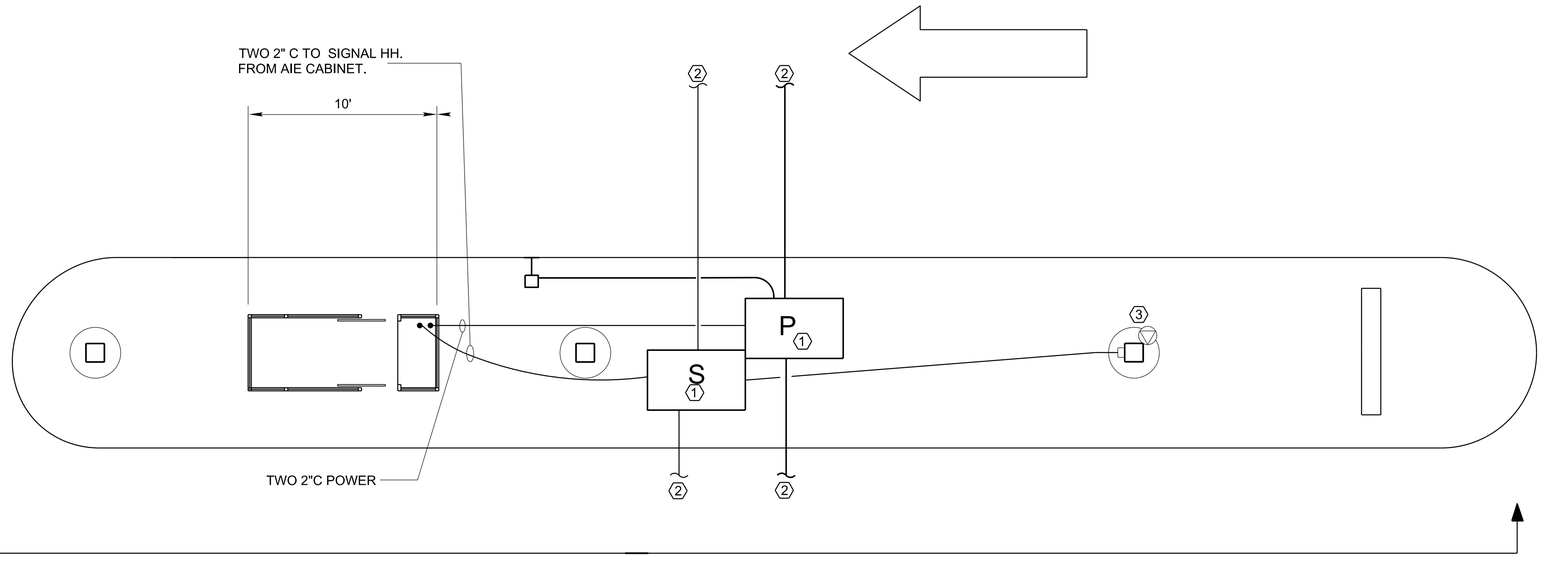
US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

DESIGNED BY: M.MCNAMARA
DRAWN BY: M.MCNAMARA
CKD BY: J.MOENCH
SUBMITTED BY: S.LINDGREN
DATE: FEBRUARY 2021
SOLICITATION NO.: Z
CONTRACT NO.: Z
PLOT DATE:
PLOT SCALE:
FILE NUMBER: Z
SIZE:
FILE NAME: E-153 NEW ISLAND TYP PLAN & ELEV.dgn

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

TYPICAL ISLAND TYPICAL PLAN & ELEVATION
FOR AIE & OTHER SYSTEMS

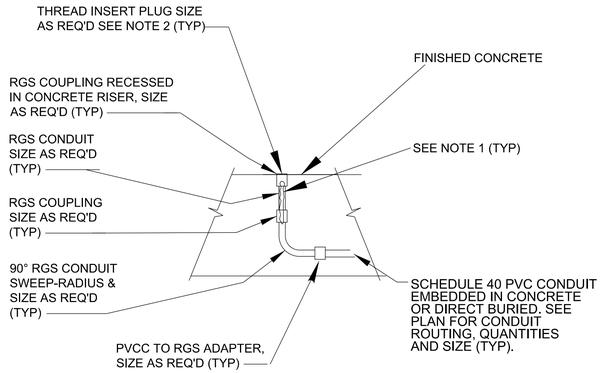
SHEET IDENTIFICATION
E-153
00



ISLAND TYPICAL PLAN

1

SCALE: 1/4" = 1'-0"



NOTES:

1. PULL STRING SHALL BE PROVIDED AND INSTALLED INSIDE CONDUIT. EXCESS PULL STRING SHALL BE COILED NEAR PLUG FOR USE.

2. INSTALL CONDUIT PLUG PRIOR TO ENCASING CONDUIT IN CONCRETE.

TYPICAL EMBEDDED CONDUIT STUB UP DETAIL

2

NOT TO SCALE

ISLAND ELEVATION

A

4' 2' 0 4'

SCALE: 1/4" = 1'-0"

KEYED NOTES:

1. P IS FOR POWER (600V OR LESS) HANDHOLE. S IS FOR SIGNAL (CONTROL CABLES) HANDHOLE. SUGGESTED SIZE FOR EACH IS 36" X 60" X 36"D. THE SIGNAL HANDHOLE MUST HAVE A SOLID BOTTOM.

2. CONDUIT REQUIREMENTS FOR AIE ONLY WHEN GOING FROM GATEHOUSE/HYT OR OTHER LOCATION TO FIRST HANDHOLE AND THEN BETWEEN ISLANDS:
POWER: TWO 2"C; SIGNAL ONE 4"C.

3. THE ANTENNA CAN BE LOCATED EITHER AT THE GATE HOUSE OR ON THE CANOPY DEPENDING ON THE BEST POSITION TO SUPPORT LINE OF SIGHT.

GENERAL NOTES

1. PLAN IS FOR NEW CONSTRUCTION. THE PLAN SHOWS PLACEMENT OF CONDUITS REQUIRED FOR AUTOMATED INSTALLATION ENTRY (AIE) EQUIPMENT. DETAIL 2 SHOWS SUGGESTED METHOD OF CONDUIT PLACEMENT IN THE CONCRETE, BUT OTHER METHODS ARE ALLOWED.

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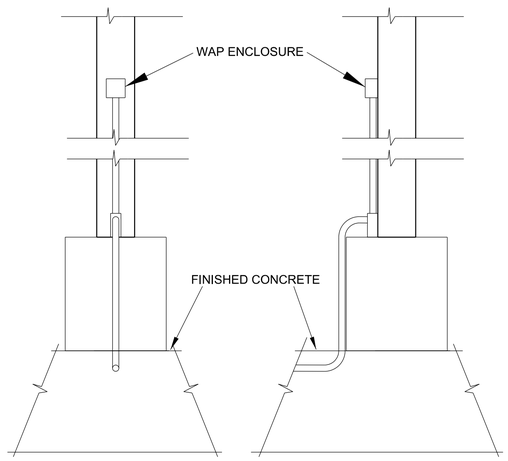
6. FOR REFERENCE, THE AIE CABINET LOCATED AT THE GATEHOUSE/HUT OR OTHER LOCATION IS TYPICALLY A 45U: 78"H X 29"W X 42"D.



WAP ENCLOSURE DETAIL

3

NOT TO SCALE

STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGEMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS.

US Army Corps of Engineers
OMAHA DISTRICT

MARK	DESCRIPTION	DATE	APPR

MARK	DESCRIPTION	DATE	APPR

US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

DESIGNED BY: M.MCNAMARA
DRAWN BY: M.MCNAMARA
CKD BY: J.MOENCH
SUBMITTED BY: S.LINDGREN
PLOT SCALE:
DATE: FEBRUARY 2021
SOLICITATION NO.: Z
CONTRACT NO.: Z
PLOT DATE:
FILE NUMBER: Z
SIZE:
FILE NAME: E-154 AIE HANDHELD

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

AIE HANDHELD

SHEET IDENTIFICATION
E-154
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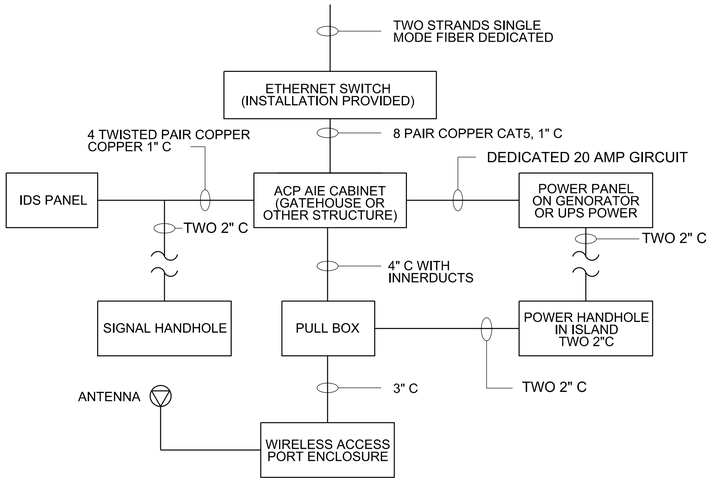

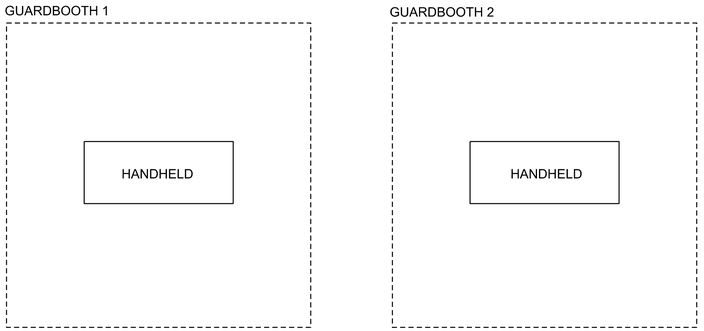

STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGEMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS.

US Army Corps of Engineers®
OMAHA DISTRICT

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CORPS OF ENGINEERS
OMAHA, NEBRASKA

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SUBMITTED BY: S.LINDGREN		CONTRACT NO.: Z	
PLOT SCALE:	PLOT DATE:	FILE NUMBER: Z	
SIZE:	FILE NAME: E-155 AIE HANDHELD BLOCK		

VARIOUS LOCATIONS
3D BIM TRANSLATION
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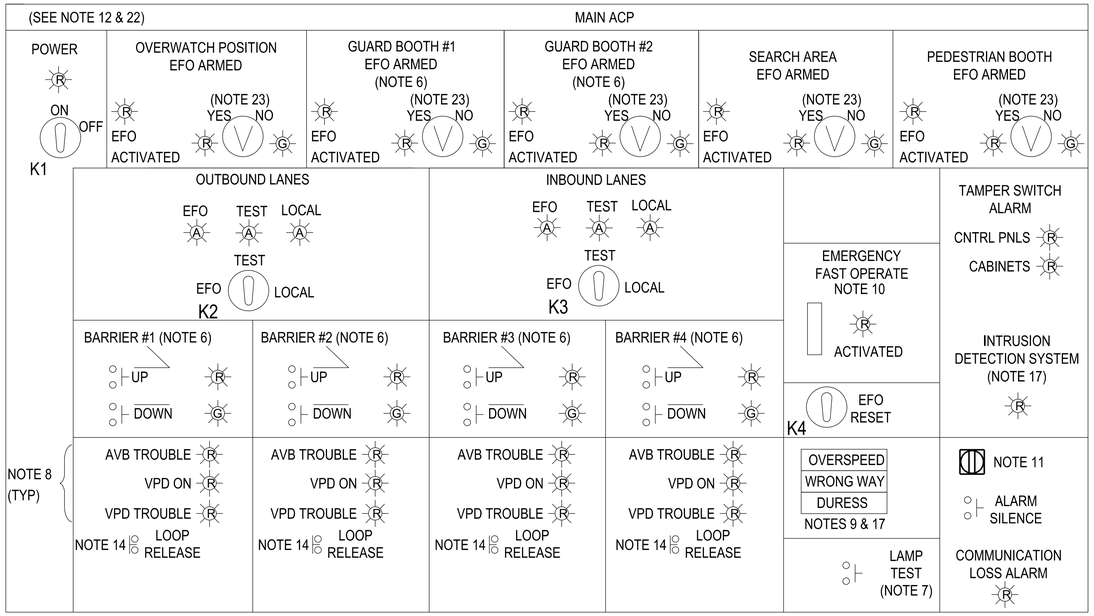
ACCESS CONTROL POINT

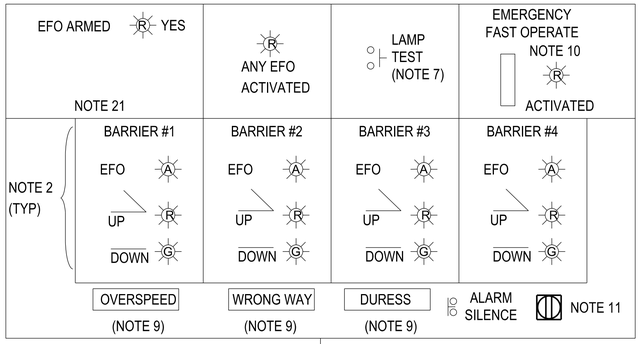
AIE HANDHELD BLOCK DIAGRAM

SHEET IDENTIFICATION
E-155
00



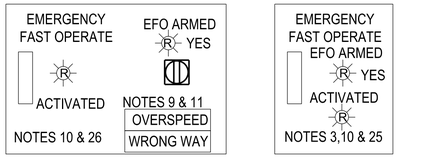
COMMAND & CONTROL MASTER CONTROL OPERATING PANEL

HYBRID BEACON (SIGNS AND SIGNALS)
SAFETY SYSTEM
NOT TO SCALE



OVERWATCH POSITION CONTROL OPERATING PANEL

HYBRID BEACON (SIGNS AND SIGNALS)
SAFETY SYSTEM
NOT TO SCALE



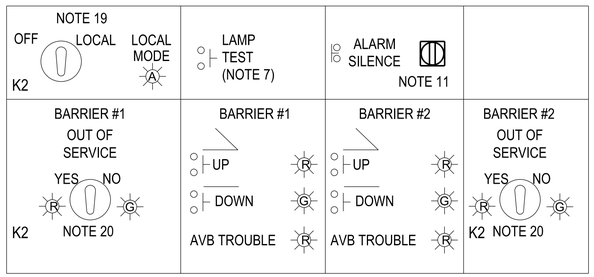
SEARCH AREA(S) & MAIN GUARD BOOTH OPERATING PANEL

NOT TO SCALE

GUARD BOOTH EFO CONTROL BUTTON OPERATING PANEL BY DOOR

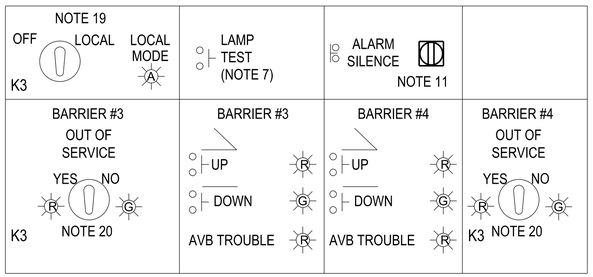
NOT TO SCALE

HYBRID BEACON (SIGNS AND SIGNALS)
SAFETY SYSTEM
NOT TO SCALE



LOCAL CONTROL PANEL AT INBOUND BARRIER

HYBRID BEACON (SIGNS AND SIGNALS) SAFETY SYSTEM
NOT TO SCALE



LOCAL CONTROL PANEL AT OUTBOUND BARRIER

HYBRID BEACON (SIGNS AND SIGNALS) SAFETY SYSTEM
NOT TO SCALE

NOTES:
1. THE CONTROL PANEL LAYOUTS DEPICT AN ACCESS CONTROL POINT (ACP) WITH A GATEHOUSE, 2 GUARD BOOTHS, A SEARCH AREA, PEDESTRIAN BOOTH, AN OVER WATCH POSITION, AND 4 ACTIVE VEHICLE BARRIERS (AVB). THE BARRIER LAYOUTS ARE NOTIONAL SINCE IT WILL VARY WITH EACH ACP AND AVB SYSTEM.

2. BARRIER MODE AND STATUS INDICATING LIGHTS ARE OPTIONAL. PROVIDE AT REQUEST OF THE INSTALLATION. IF THE OVERWATCH IS A PARKING POSITION, IT IS RECOMMENDED TO NOT PROVIDE.

3. PROVIDE A SEPARATE STAND ALONE EFO TOGGLE SWITCH OR RED PUSH BUTTON WITH SAFETY COVER MOUNTED ON THE INSIDE OF THE GUARD BOOTH TO THE LEFT OF THE DOOR FRAME FOR EASY ACCESS BY THE GUARD WHO MAY BE STANDING OUTSIDE GUARD BOOTH DURING ID CHECKS.

4. BARRIER MODE SELECTOR SWITCHES SHALL BE KEY OPERATED:

   a. UNDER NORMAL OPERATIONS,THE BARRIER MODE SELECTOR SWITCHES WILL BE IN THEIR EFO POSITIONS WITH KEYS REMOVED AND STORED IN A LOCKED CABINET IN THE GATEHOUSE ACCESSIBLE ONLY BY THE CHIEF OF THE GUARDS.
   b. WHEN PERFORMING BARRIER MAINTENANCE, MAINTENANCE PERSONNEL WILL OBTAIN THE KEY FROM THE CHIEF OF THE GUARDS, PLACE THE SWITCH IN THE "LOCAL" POSITION, AND THEN REMOVE AND RETAIN THE KEY. THE MAINTENANCE PERSON WILL THEN PUT THE KEY IN THE MODE SELECTOR SWITCH ON THE BARRIERS LOCAL CONTROL PANEL LOCATED AT THE BARRIER AND TURN THE KEY TO THE "LOCAL" POSITION TO ACTIVATE THE OPEN AND CLOSE SWITCHES ON THE LOCAL CONTROL PANEL. WHEN MAINTENANCE IS COMPLETE, THE MAINTENANCE PERSON WILL PLACE THE MODE SELECTOR SWITCH ON THE LOCAL CONTROL PANEL BACK TO "OFF" MODE, REMOVE THE KEY, AND RETURN THE KEY TO THE CHIEF OF THE GUARDS.THE CHIEF OF THE GUARDS WILL USE THE KEY TO PLACE THE BARRIER'S MODE SELECTOR SWITCH ON THE MASTER CONTROL PANEL IN THE "EFO" POSITION, AND THEN WILL REMOVE AND LOCKUP THE KEY.
   c. A GUARD MAY TEST OPERATE A BARRIER BY FIRST OBTAINING THE BARRIER'S MODE SWITCH KEY FROM THE CHIEF OF THE GUARDS, PLACING THE MODE SWITCH IN THE "TEST" POSITION, AND THEN OPENING OR CLOSING THE BARRIER WITH THE PUSHBUTTONS ON THE MASTER CONTROL PANEL. UPON COMPLETION OF THE TEST OPERATIONS, THE GUARD WILL RETURN MODE TO "EFO", REMOVE THE KEY, AND RETURN IT TO THE CHIEF OF THE GUARDS. PROCEDURES MUST BE IN PLACE TO ENSURE ALL OPERABLE BARRIERS' MODE SELECTOR SWITCHES ARE PLACED IN THE EFO POSITIONS FOR THE PROPER RESPONSE TO AN EFO COMMAND.

5. SEE UFGS 34 71 13.19 "CRASH RATED ACTIVE VEHICLE BARRIERS AND CONTROLS" APPENDIX A "CONVENTIONAL SIGNS AND SIGNALS SAFETY SYSTEM" FOR DESCRIPTIONS OF THE REQUIRED BARRIER AND TRAFFIC CONTROL SEQUENCES. THE HYBRID BEACON SAFETY SCHEME INDICATED IS BASED ON SDDCTEA PAMPHLET 55-15, 2014. SOME OF THE ITEMS SHOWN IN THE PANELS WERE NOT ORIGNAL REQUIREMENTS IN 2014 SUCH AS HAVING EFO ACTIVATION ON MASTER CONTROL PANEL FOR THE REMOTE EFOS. ALL FUNCTIONS SHOWN ARE TO INCLUDED IF PANELS ARE REPLACED.

6. LABEL FOR BARRIER AND GUARD BOOTH DESCRIPTION SHALL USE VERBAGE TO HELP DESCRIBE THE LOCATION SUCH AS EAST AND WEST OR INSIDE & OUTSIDE.

7. LAMP TEST PUSH BUTTON SHALL TURN ON ALL INDICATING LIGHTS WHILE BUTTON IS PUSHED WITHOUT EFFECTING ANY CONTROLS.

LEGEND

- KX - KEY DESIGNATION WHERE X CORRESPONDS TO A NUMBER
- G - GREEN INDICATING LIGHT
- R - RED INDICATING LIGHT
- A - AMBER INDICATING LIGHT
- CONTROL SWITCHES
- SELECTOR SWITCH
- KEY OPERATED CONTROL SWITCH
- EFO SWITCH OR PUSH BUTTON WITH SAFETY COVER (MOMENTARY ACTION)
- BACK LIT WINDOW OR FLASHING RED INDICATOR

NOTES CONTINUED:
8. THE INDICATING LIGHT LABELED 'AVB TROUBLE' SHALL COME ON FOR ANY PROBLEMS OR ALARM CONDITIONS AT THE BARRIER, e.g. LOW OIL AIR PRESSURE, LOW VOLTAGE, ETC. THE INDICATING LIGHT LABELED 'VPD ON' SHALL COME ON WHEN ANY OF THE BARRIER'S VEHICLE PRESENCE DETECTORS (VPD'S) GETS A CALL (VEHICLE DETECTED) FOR MORE THAN 15 SECONDS. THE VPD TROUBLE SHALL COME ON WHEN THERE IS A PROBLEM DETECTED ON THE VEHICLE PRESENCE DETECTORS OR CONTROLLER.

9. OVERSPEED, WRONG-WAY, AND DURESS ALARMS AND CAN EITHER BE BACK LIT WINDOWS OR RED INDICATING LIGHTS. PROVIDE AN ADJUSTABLE AUDIBLE ALARM. ALARMS. DURESS ALARMS SHALL BE ON OVERWATCH POSITION PANEL AND COMMAND & CONTROL MASTER CONTROL PANEL ONLY. SILENCE SWITCH CAN BE USED TO SILENCE AUDIBLE ALARMS. ALL OVERSPEED AND WRONG WAY ALARMS SHALL BE SELF CLEARING. DURESS ALARM DOES NOT NEED TO BE MONITORED AT THE MASTER CONTROL PANEL IF DONE BY ANOTHER PANEL IN THE COMMAND & CONTROL AREA.

10. AREA AROUND EFO SWITCH SHALL BE RED.

11. AUDIBLE ALARM, ALARM SHALL HAVE A MEANS TO ADJUST THE VOLUME.

12. PANEL ORIENTATION AND LABELING SHALL MATCH THE WAY THE GUARD VIEWS THE BARRIERS AND GUARD BOOTHS.

13. CONTROLS SHALL BE MADE SO THAT IF AN ACTIVE VEHICLE BARRIER (AVB) IS IN TEST OR LOCAL MODE AND AN EFO IS PUSHED THEN TURNING THE THREE POSITION SWITCH TO EFO PRIOR TO AN EFO RESET SHALL NOT CAUSE THE AVB TO DEPLOY.

14. LOOP SAFETY. WHEN THE PRESENCE DETECTION LOOPS IN FRONT OF AND BEHIND THE BARRIER ARE MORE THAN 10 FEET APART, A SAFETY CIRCUIT MUST BE ADDED TO ENSURE THAT THE BARRIER WILL NOT CLOSE (DEPLOY) ON A VEHICLE THAT IS OVER THE BARRIER BUT BETWEEN THE LOOPS SO IS NOT DETECTED BY EITHER LOOP. THE FOLLOWING ARE APPROVED CIRCUITS:

   a. LATCHING CIRCUIT. WHEN A VEHICLE IS DETECTED BY LOOP 1, THE CONTROL LOGIC PICKS-UP AND SEALS ITSELF IN. AFTER THE VEHICLE PASSES OVER THE BARRIER IT SHOULD BE DETECTED BY LOOP 2 WHICH WILL DROP OUT RELAY FROM LOOP 1. LOOP RELEASE PUSHBUTTON IS REQUIRED TO DROPOUT RELAY LOOP 1 RELAY IN THE EVENT A VEHICLE IS DETECTED BY LOOP 1 BUT IS NOT DETECTED BY LOOP 2. IF THE VEHICLE PASSES OVER THE BARRIER BUT IS NOT DETECTED BY LOOP 2, THE LOOP 1 RELAY STAYS PICKED-UP EVEN THOUGH THERE IS NO VEHICLE OVER THE BARRIER. AFTER 15 SECONDS AT THIS CONDITION, AN ALARM SOUNDS TO ALERT THE GUARD THAT BARRIER'S LOOP CIRCUIT IS LATCHED. THE GUARD MUST VISUALLY CHECK THE BARRIER AND, IF THERE IS NOT A VEHICLE OVER IT, THE PUSH THE LOOP RELEASE TO DROP OUT THE RELAY AND CLEAR THE LOOP LATCH.
   b. TIME DELAY CIRCUIT. AN ALTERNATIVE TO THE LOOP LATCH CIRCUIT DESCRIBED ABOVE IS A CIRCUIT USING A SHORT (0.5 - 1 SECOND) TIME DELAY. A VEHICLE PASSING OVER LOOP 1 PICKS-UP A TIMER RELAY. AFTER THE VEHICLE CLEARS LOOP 1, THE TIMER EXTENDS THE 'ACTIVATION' OF LOOP 1 FOR THE TIME INDICATED. AFTER THE TIME EXPIRES, THEN LOOP 1 PER THE CONTROL LOGIC WILL LOOK LIKE IT IS CLEARED. THE ADDED TIME ALLOWS THE PASSING VEHICLE TO TRAVEL THE DISTANCE BETWEEN LOOPS 1 AND 2 BEFORE THE TIMER RUNS OUT. THE VEHICLE SHOULD BE DETECTED BY LOOP 2, WHICH WILL CONTINUE TO PREVENT BARRIER CLOSURE (DEPLOYMENT) UNTIL THE VEHICLE CLEARS LOOP 2.

15. PUSH BUTTONS WITH A CORRESPONDING INDICATING LIGHT ARE ALLOWED TO BE COMBINED INTO ONE DEVICE.

16. PICTOGRAPHS SHOWING UP/DOWN (CLOSED/OPEN) ARE TO BE PROVIDED BY THE PUSH BUTTONS. CONTROLS PANELS SHOW A 'WEDGE' STYLE IN THIS EXAMPLE. PICTOGRAPH SHALL MATCH THE ACTUAL TYPE OF BARRIER.

17. IF REMOTE MONINTORING OF AN EFO ACTIVATION IS REQUIRED, THEN SEE SHEET E-102.

18. IT IS ALLOWED TO USE OPEN/CLOSE INSTEAD OF UP/DOWN.

19. THE INBOUND AND OUTBOUND LOCAL PANELS CAN BE COMBINED INTO ONE ENCLOSURE IF THE LOCATION OF THE POWER UNITS ARE ADJACENT TO EACH OTHER.

20. OUT-OF-SERVICE SWITCH IS OPTIONAL WHEN THERE IS ONL Y ONE LANE PER DIRECTION OF TRAVEL OR ONE AVB CROSSING MULTIPLE LANES; OTHEWISE, FOR MULTIPLE LANES PER DIRECTION OF TRAVEL PROVIDE.

21. OPERATING PANEL FOR THE SEARCH AREA PANEL IS TO BE MOUNTED IN A NEMA 4 LOCKABLE PANEL OR THE OPERATING PANEL MUST BE WEATHERPROOF.

22. PLACE A PLACARD ON THE MASTER CONTROL PANEL WHICH STATES

SPECIAL ALARMS:

MASTER EFO MODE LOCAL IN LOCAL MODE	MASTER EFO & LOCAL LIGHTS FLASHING
MASTER TEST MODE LOCAL IN LOCAL MODE	MASTER TEST & LOCAL LIGHTS FLASHING
MASTER PLACED EFO MODE & AVBS INCORRECT	MASTER EFO MODE LIGHT FLASH
OUT OF SERVICE	UP & DOWN LIGHTS ALTERNATE FLASH

23. ONE INDICATING LIGHT IS ALLOWED INSTEAD OF TWO INDICATING LIGHTS. CONFIGURATIONS WITH ONE LIGHT MUST BE RED AND ILLUMINATE WHEN SWITCH IS IN THE ARMED POSITION. IT IS ALLOWED TO HAVE THE SWITCH KEYED. IF KEYED ALL REMOTE EFOS CAN BE KEYED ALIKE OR DIFFERENTLY, BUT KEY(S) CANNOT MATCH THE OTHER KEYED SWITCHES.

24. IF ALLOWED IN THE CONTRACT, PROVIDE HARD CONTROL OR TOUCHSCREEN CONTROL FOR THE OPERATING PANELS; HOWEVER, EFO IS REQUIRED TO BE A DISCRETE HARD CONTROL SWITCH WITH A COVER IN BOTH CASES.

25. THIS EFO OPERATING PANEL IS USED ONLY ON ARMY PROJECTS.

26. AIR FORCE. ON AIR FORCE PROJECTS THE VISUAL ALARM IS NOT REQUIRED AS LONG AS THE AUDIBLE ALARM IS PROVIDED.

27. OPTION. THIS IS NOT STANDARD, BUT AN ADDITIONAL KEYED SWITCH IS ALLOWED TO BYPASS THE SAFETY LOOP ON THE ACTIVE VEHICLE BARRIER SO THAT IT CAN BE LOWERED. THIS WOULD HAVE TO BE APPROVED BY THE INSTALLATION.

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PLOT DATE:
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FILE NUMBER: Z
SIZE:
FILE NAME: E-101 HYBRID BEACON AVB PANELS.dgn

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

CONVENTIONAL SIGNS AND SIGNALS
AVB CONTROL PANELS

SHEET IDENTIFICATION
E-160
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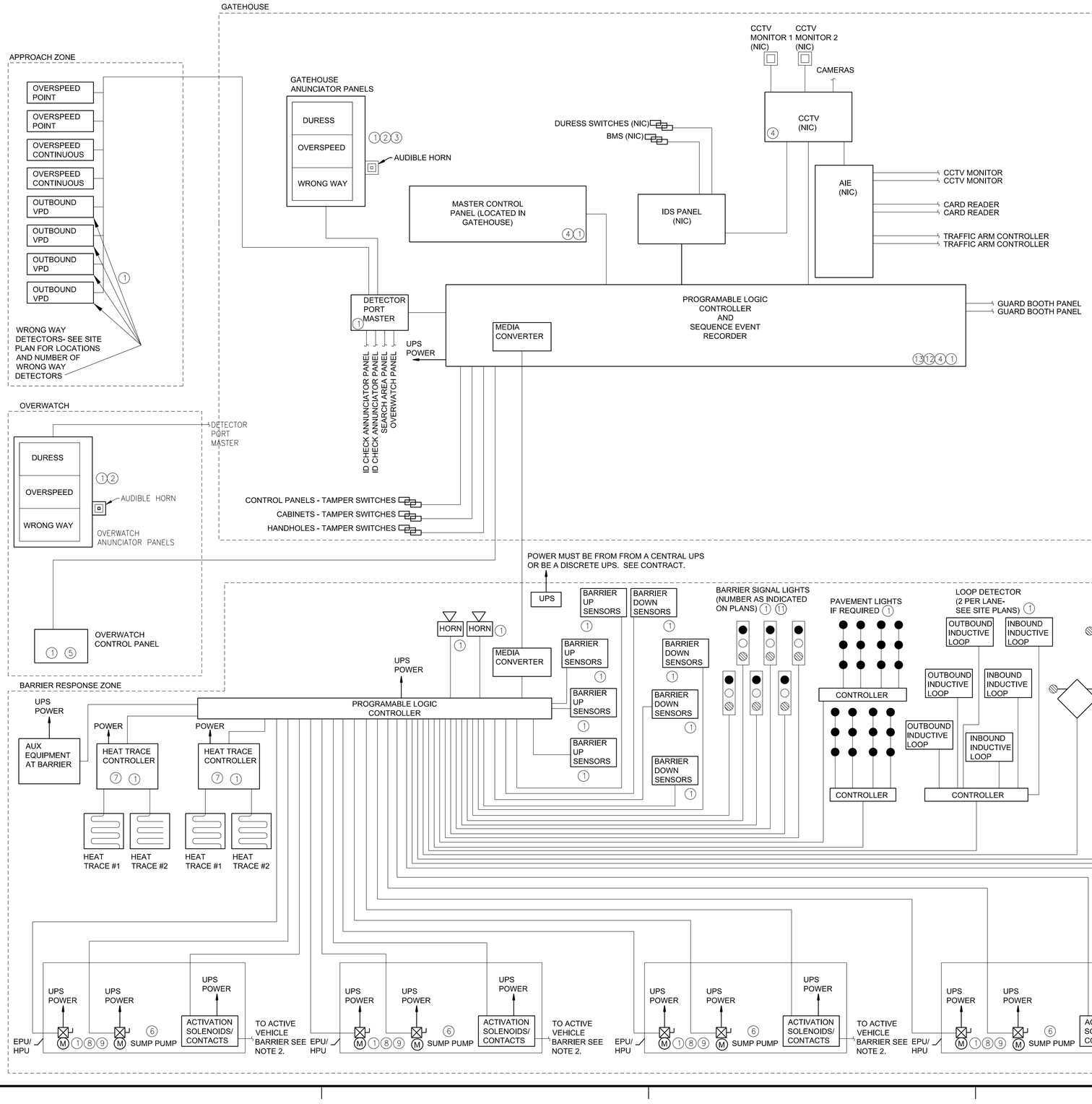


CONSTRUCTION NOTES:

1. PROVIDE DEVICE AND ALL POWER AND CONTROL CONNECTIONS AS REQUIRED.
2. ANNUNCIATOR PANEL WITH AUDIBLE ALARM AND BACKLIT "WRONG WAY" & "DURESS" DISPLAY.
3. CAN BE PART OF MASTER CONTROL PANEL INSTEAD OF SEPARATE PANEL.
4. PROVIDE A DRY CONTACT FOR CCTV CAMERA CONNECTION.
5. PROVIDE A 20' CABLE FOR PANEL PORTABILITY IF AN OVERWATCH PAD INSTEAD OF A BOOTH. PROVIDE ALL CONNECTIONS AND APPURTENANCES AS REQUIRED.
6. OVERWATCH PANEL IS EITHER IN A BUILDING OR A PAVED PAD. PAVED PAD REQUIRES A LONG CORD AND PANEL LARGE ENOUGH TO LOCK THE PANEL IN IT.
7. BARRIER HEAT TAPE.
8. BARRIER EPU OR HPU. IF HPU MOTOR DOES NOT NEED UPS.
9. EPU'S SHALL BE PROVIDED WITH AN UPS THAT MATCHES THE MOTOR & MOTOR CONTROLLER CHARACTERISTICS.
10. BEAM TYPE DETECTORS.
11. HYBRID BEACON WITH TWO RED AND ONE YELLOW.
12. PROVIDE TWO DRY CONTACTS TO BE MONITORED BY THE IDS PANEL. CONTACTS ARE NORMALLY OPEN AND WILL CHANGE TO NORMALLY CLOSED ON ACTIVATION. ONE CONTACT IS FOR ANY EFO ACTIVATION AND THE OTHER FOR ANY TAMPER SWITCH ACTIVATION.
13. PROVIDE DRY CONTACTS TO BE MONITORED BY THE CCTV SYSTEM. SEE SPECIFICATION.

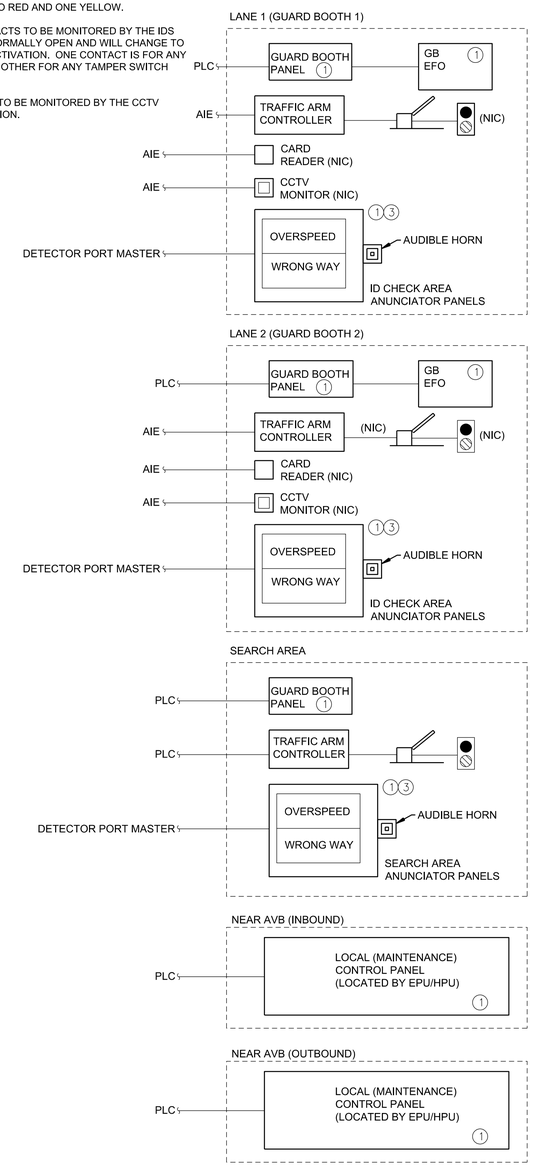
GENERAL NOTES:

1. SEE SITE PLANS FOR RELATIVE EQUIPMENT LOCATIONS. COORDINATE EXACT LOCATIONS WITH END USER PRIOR TO INSTALLATION.

2. INSTALL ALL EQUIPMENT PER MANUFACTURERS REQUIREMENTS. PROVIDE ALL CONDUIT, CONDUCTORS, CABLING, AND ALL ELECTRICAL APPURTENANCES AS REQUIRED FOR A COMPLETE AND FUNCTIONAL INSTALLATION. THIS INCLUDES ANY CHANGES TO CONDUCTORS, CONDUITS, PANELBOARDS, UPS AND GENERATOR.

3. SEE SPECIFICATIONS 34 71 13.19 CRASH RATED ACTIVE VEHICLE BARRIER AND CONTROLS FOR SPECIFIC REQUIREMENTS.

4. DIAGRAM IS FOR FOUR AVBS. TWO GUARDBOOTHS, ONE SEARCH AREA, AND AN OVERWATCH AND FIXED AIE. IF HANDHELD AIE THEN TRAFFIC ARMS/SIGNAL, REAR TAG CAMERA, AND CARD READER ARE NOT PROVIDED BY AIE. PROVIDE TRAFFIC ARM/SIGNAL AS PART OF CONTRACT. DELETE DRIVER INTERFACE CARD READER. PROVIDE CONDUIT FOR THE REAR TAG CAMERA. NOTE THAT THE PEDESTRIAN BOOTH IS NOT SHOWN EVEN THOUGH IT IS ON THE PANEL LAYOUT.



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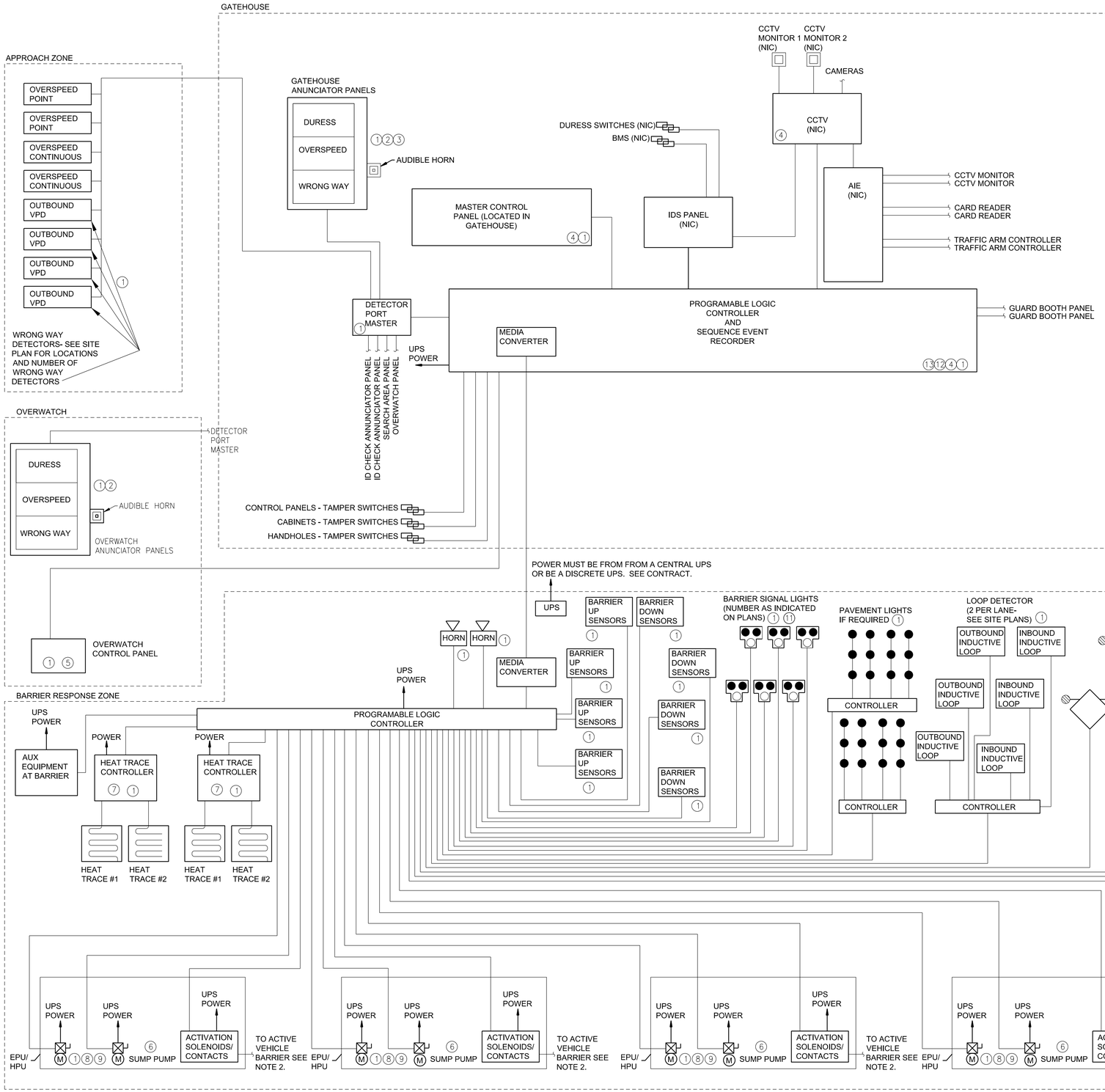
FILE NUMBER: Z
FILE NAME: E-102 HYBRID BEACON CONT AVB SYS DIAGRAM

US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

R/Y/G CONVENTIONAL SIGNS AND SIGNALS SYSTEM DIAGRAM

SHEET IDENTIFICATION
E-161



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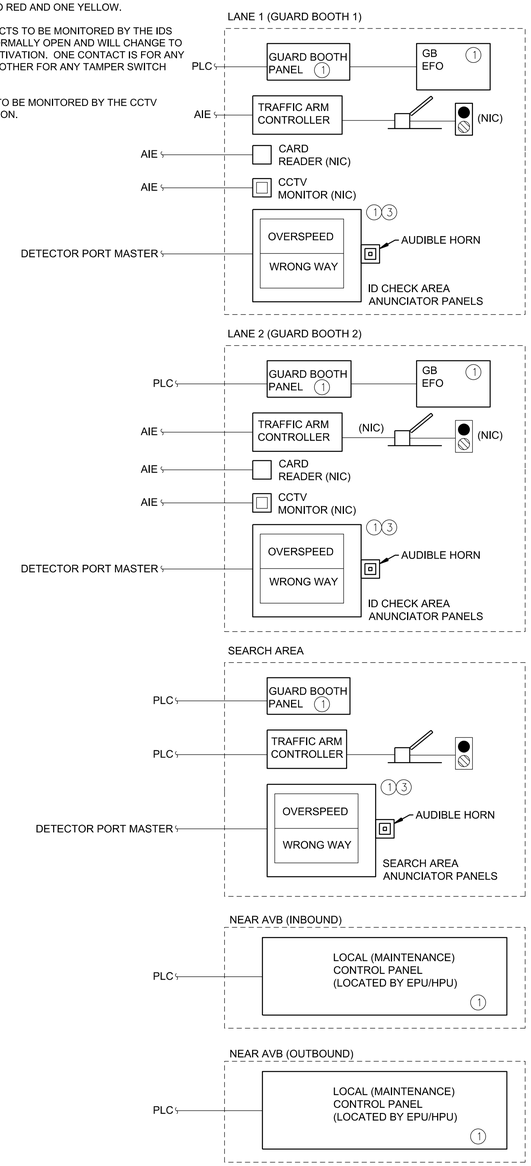

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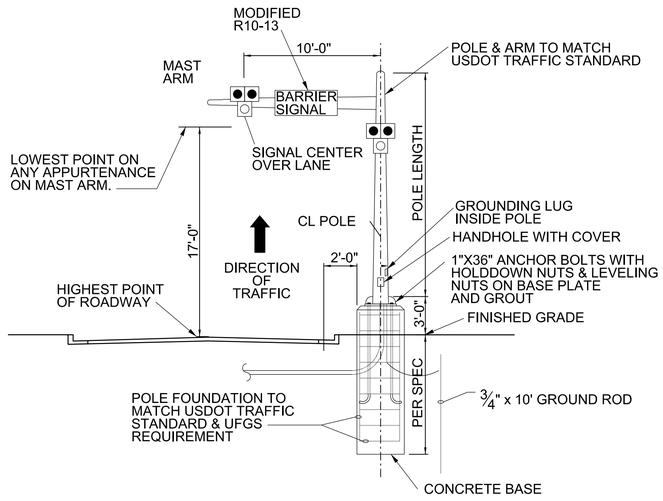
FILE NAME: E-102 HYBRID BEACON CONT AVB SYS DIAGRAM

US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

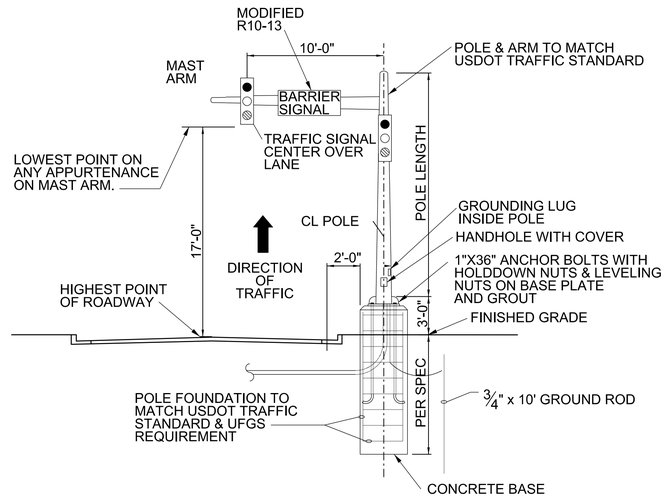
VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

HYBRID BEACON CONVENTIONAL SIGNS AND SIGNALS CONTROL SYSTEM DIAGRAM

SHEET IDENTIFICATION
E-162



1 Y602GH ELEVATION TYPICAL - HYBRID BEACON
NOT TO SCALE



3 Y602GH ELEVATION TYPICAL - RED/YELLOW/GREEN SIGNAL
NOT TO SCALE

GENERAL NOTES:

1. AT THE END OF 9 SECONDS (TO INCLUDE 3 SECOND REACTION TIME) ALL BARRIERS ARE TO BE FULLY DEPLOYED.

2. CHOSE THE APPROPRIATE SEQUENCE OF OPERATION TABLE AND TRAFFIC SIGNAL POLE DETAIL.

3. 100 dB HORN SHALL BE ADJUSTABLE. HORN IS TO SOUND FOR 6-10 SECONDS AFTER THE EFO IS PUSHED AND THEN TURN OFF.

4. IN-PAVEMENT LIGHTS ARE ONLY REQUIRED IF THE ACTIVE VEHICLE BARRIER DOES NOT HAVE BARRIER LIGHTS.

5. PROVIDE AT THE ID CHECK CANOPY. A MINIMUM OF ONE PER TWO LANES MOUNTED ON COLUMN NEAR ENTRANCE TO ID CHECK AREA. IT IS OPTIONAL TO HAVE ONE MOUNTED IN THE SEARCH AREA.

HYBRID BEACON - SIGNS & SIGNALS (9 SECOND) SAFTEY SCHEME

TRAFFIC CONTROL AND SAFETY AT ACTIVE BARRIERS	OPERATIONAL SEQUENCE PER SECOND (MIN FOR SAFETY - 40 KPH (25 MPH) DESIGN SPEED)										
	TIMELINE (SEC)	--	1	2	3	4	5	6	7	8	9	10
	TRAFFIC CONTROL	NORMAL OPS	GUARD PERCEPTION AND REACTION TIME TO THREAT (BUTTON)			SYSTEM OPERATING AFTER EFO ACTIVATED						THREAT CONTAINED
HYBRID BEACON CONVENTIONAL SIGNS & SIGNALS SAFETY SCHEME	WARNING SIGN WITH BEACONS	DARK/OFF	DARK/OFF			ALTERNATING FLASHING YELLOW						
	HYBRID BEACON	DARK/OFF	DARK/OFF			SOLID YELLOW			ALTERNATING FLASHING RED			
	100 dB HORN (ADJUSTABLE)	SILENT	SILENT			ACTIVATED (6 - 10 SECONDS ON)						
	ACTIVE VEHICLE BARRIER	DOWN/OPEN	DOWN/OPEN			DOWN/OPEN				DEPLOYING		DEPLOYED
	BARRIER LIGHTS	DARK/OFF	DARK/OFF			ON - FLASHING RED						
	IN-PAVEMENT LIGHTS	DARK/OFF	DARK/OFF			DARK/OFF				ON - STEADY RED		

R/Y/G - SIGNS & SIGNALS (9 SECOND) SAFTEY SCHEME

TRAFFIC CONTROL AND SAFETY AT ACTIVE BARRIERS	OPERATIONAL SEQUENCE PER SECOND (MIN FOR SAFETY - 40 KPH (25 MPH) DESIGN SPEED)										
	TIMELINE (SEC)	--	1	2	3	4	5	6	7	8	9	10
	TRAFFIC CONTROL	NORMAL OPS	GUARD PERCEPTION AND REACTION TIME TO THREAT (BUTTON)			SYSTEM OPERATING AFTER EFO ACTIVATED						THREAT CONTAINED
R/Y/G CONVENTIONAL SIGNS & SIGNALS SAFETY SCHEME	WARNING SIGN WITH BEACONS	DARK/OFF	DARK/OFF			ALTERNATING FLASHING YELLOW						
	R//Y/G	GREEN	GREEN			SOLID YELLOW			RED			
	100 dB HORN (ADJUSTABLE)	SILENT	SILENT			ACTIVATED (6 TO 10 SECONDS ON)						
	ACTIVE VEHICLE BARRIER	DOWN/OPEN	DOWN/OPEN			DOWN/OPEN				DEPLOYING		DEPLOYED
	BARRIER LIGHTS	DARK/OFF	DARK/OFF			ON - FLASHING RED						
	IN-PAVEMENT LIGHTS	DARK/OFF	DARK/OFF			DARK/OFF				ON - STEADY RED		

PROVIDE 3"-4" HIGH RED LED LETTERING IN A WEATHERPROOF ENCLOSURE. THE WORDING 'OVERSPEED' OR 'WRONG WAY' SHALL ILLUMINATE INDEPENDENTLY. PROVIDE AN AUDIBLE DEVICE WITH A MEANS TO ADJUST THE VOLUME. SEE NOTE 5.

2 Y602GH OVERSPEED & WRONG WAY WARNING ANNUNCIATOR
NOT TO SCALE

US Army Corps of Engineers
OMAHA DISTRICT

MARK	DESCRIPTION	DATE	APPR.

MARK	DESCRIPTION	DATE	APPR.

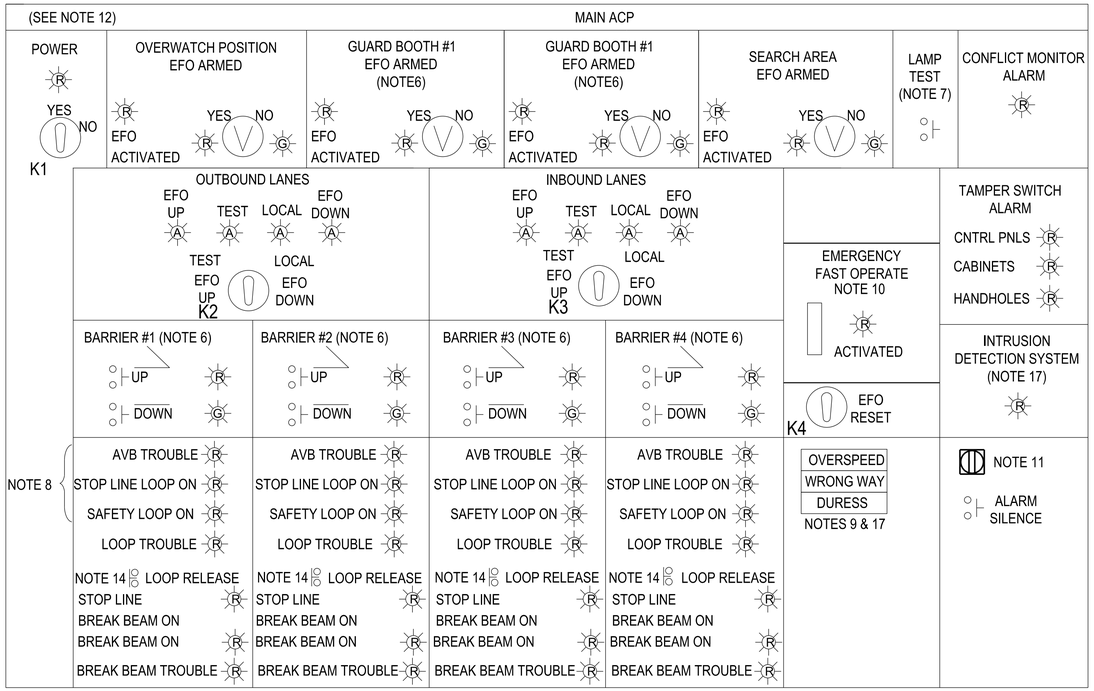
DESIGNED BY: M.MCNAMARA
DWN BY: M.MCNAMARA
CKD BY: J.MOENCH
SUBMITTED BY: S.LINDGREN
PLOT SCALE:
PLOT DATE:
SIZE:
DATE: FEBRUARY 2021
SOLICITATION NO.: Z
CONTRACT NO.: Z
FILE NUMBER: Z
FILE NAME: E-163 HYBRID BEACON CTRL SEQUENCE AND DETAILS

US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

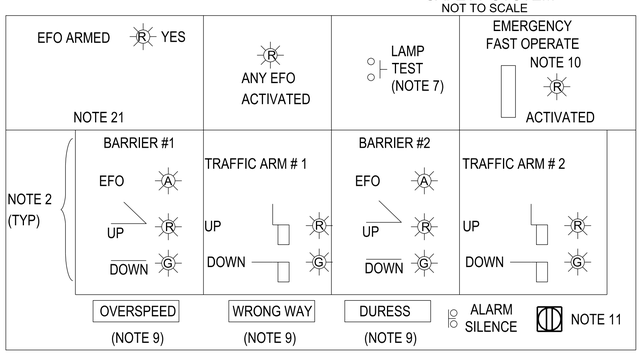
VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

CONVENTIAL SIGNS AND SIGNALS
CONTROL SEQUENCE AND DETAILS

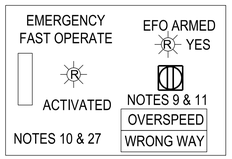
SHEET IDENTIFICATION
E-163



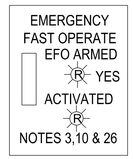
COMMAND & CONTROL MASTER CONTROL OPERATING PANEL
PRESENCE DETECTION
SAFETY SYSTEM
NOT TO SCALE



OVERWATCH POSITION CONTROL OPERATING PANEL
PRESENCE DETECTION SAFETY SYSTEMS
NOT TO SCALE

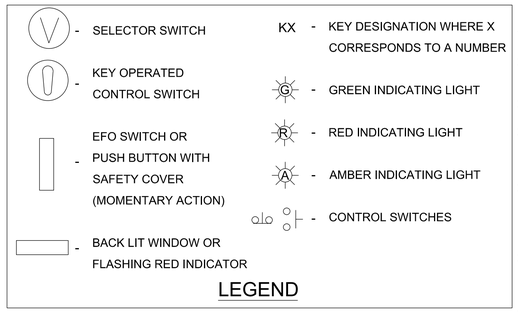


SEARCH AREA(S) & MAIN GUARD BOOTH OPERATING PANEL
NOT TO SCALE

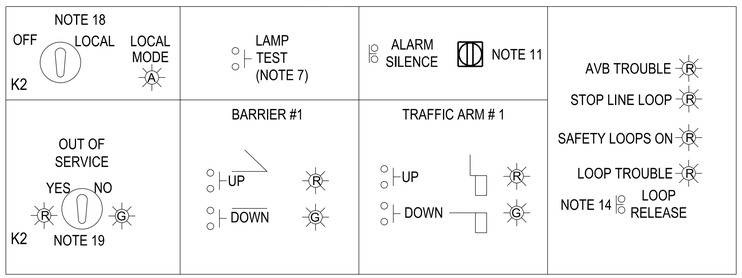


GUARD BOOTH EFO CONTROL BUTTON OPERATING PANEL BY DOOR
NOT TO SCALE

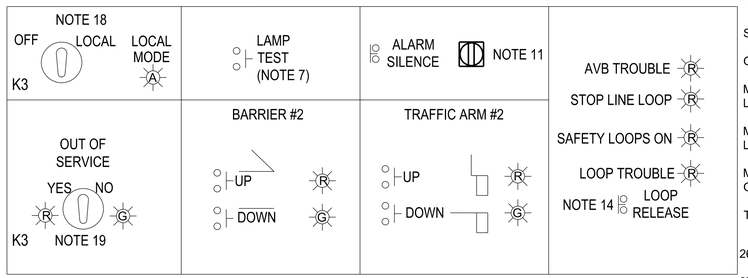
PRESCENCE DETECTION SAFETY SYSTEMS



LEGEND



LOCAL CONTROL PANEL AT INBOUND BARRIER
PRESENCE DETECTION SAFETY SYSTEMS
NOT TO SCALE



LOCAL CONTROL PANEL AT OUTBOUND BARRIER
PRESENCE DETECTION SAFETY SYSTEMS
NOT TO SCALE

NOTES:

1. THE CONTROL PANEL LAYOUTS DEPICT AN ACCESS CONTROL POINT (ACP) WITH A GATEHOUSE, 2 GUARD BOOTHS, PEDESTRIAN BOOTH, A SEARCH AREA, AND AN OVER WATCH POSITION, AND 2 ACTIVE VEHICLE BARRIERS (AVB). THE BARRIER LAYOUTS ARE NOTIONAL SINCE IT WILL VARY WITH EACH ACP AND AVB SYSTEM.

2. BARRIER MODE AND STATUS INDICATING LIGHTS ARE OPTIONAL. PROVIDE AT REQUEST OF THE INSTALLATION. IF THE OVERWATCH IS A PARKING POSITION, IT IS RECOMMENDED TO NOT PROVIDE.

3. PROVIDE A SEPARATE STAND ALONE EMERGENCY FAST OPERATE (EFO) TOGGLE SWITCH OR RED PUSH BUTTON WITH SAFETY COVER MOUNTED ON THE INSIDE OF THE GUARD BOOTH TO THE LEFT OF THE DOOR FRAME FOR EASY ACCESS BY THE GUARD WHO MAY BE STANDING OUTSIDE GUARD BOOTH DURING ID CHECKS.

4. BARRIER MODE SELECTOR SWITCHES SHALL BE KEY OPERATED:

   a. UNDER NORMAL OPERATIONS, THE BARRIER MODE SELECTOR SWITCHES WILL BE IN THEIR EFO POSITIONS WITH KEYS REMOVED AND STORED IN A LOCKED CABINET IN THE GATEHOUSE ACCESSIBLE ONLY BY THE CHIEF OF THE GUARDS.
   b. WHEN PERFORMING BARRIER MAINTENANCE, MAINTENANCE PERSONNEL WILL OBTAIN THE KEY FROM THE CHIEF OF THE GUARDS, PLACE THE SWITCH IN THE "LOCAL" POSITION, AND THEN REMOVE AND RETAIN THE KEY. THE MAINTENANCE PERSON WILL THEN PUT THE KEY IN THE MODE SELECTOR SWITCH ON THE BARRIERS LOCAL CONTROL PANEL LOCATED AT THE BARRIER AND TURN THE KEY TO THE "LOCAL" POSITION TO ACTIVATE THE OPEN AND CLOSE SWITCHES ON THE LOCAL CONTROL PANEL. WHEN MAINTENANCE IS COMPLETE, THE MAINTENANCE PERSON WILL PLACE THE MODE SELECTOR SWITCH ON THE LOCAL CONTROL PANEL BACK TO "OFF" MODE, REMOVE THE KEY, AND RETURN THE KEY TO THE CHIEF OF THE GUARDS. THE CHIEF OF THE GUARDS WILL USE THE KEY TO PLACE THE BARRIER'S MODE SELECTOR SWITCH ON THE MASTER CONTROL PANEL IN THE "EFO" POSITION,AND THEN WILL REMOVE AND LOCKUP THE KEY.
   c. A GUARD MAY TEST OPERATE A BARRIER BY FIRST OBTAINING THE BARRIER'S MODE SWITCH KEY FROM THE CHIEF OF THE GUARDS, PLACING THE MODE SWITCH IN THE "TEST" POSITION, AND THEN OPENING OR CLOSING THE BARRIER WITH THE PUSHBUTTONS ON THE MASTER CONTROL PANEL. UPON COMPLETION OF THE TEST OPERATIONS, THE GUARD WILL RETURN MODE TO "EFO", REMOVE THE KEY, AND RETURN IT TO THE CHIEF OF THE GUARDS. PROCEDURES MUST BE IN PLACE TO ENSURE ALL OPERABLE BARRIERS' MODE SELECTOR SWITCHES ARE PLACED IN THE EFO POSITIONS FOR THE PROPER RESPONSE TO AN EFO COMMAND.

5. SEE UFGS 34 71 13.19 "CRASH RATED ACTIVE VEHICLE BARRIER AND CONTROLS" APPENDIX A "HIGH EFFICIENCY PRESENCE DETECTION SAFETY SYSTEM 2015" FOR DESCRIPTIONS OF THE BARRIER AND TRAFFIC CONTROL SEQUENCES. THESE CONTROLS ARE BASED ON SDDCTEA PAMPHLET 55-15, 2014 WITH A 2015 UPDATE.

6. LABEL FOR BARRIER AND GUARD BOOTH DESCRIPTION SHALL USE VERBAGE TO HELP DESCRIBE THE LOCATION SUCH AS EAST AND WEST OR INSIDE & OUTSIDE.

7. LAMP TEST PUSH BUTTON SHALL TURN ON ALL INDICATING LIGHTS WHILE BUTTON IS PUSHED WITHOUT EFFECTING ANY CONTROLS

NOTES CONTINUED:

8. THE INDICATING LIGHT LABELED 'AVB TROUBLE' SHALL COME ON FOR ANY PROBLEMS OR ALARM CONDITIONS AT THE BARRIER, e.g. LOW OIL AIR PRESSURE, LOW VOLTAGE, ETC. THE INDICATING LIGHT LABELED 'SAFETY LOOP ON' OR 'BREAK BEAM ON' SHALL COME ON WHEN ANY OF THE BARRIER'S VEHICLE PRESENCE DETECTORS GETS A CALL (VEHICLE DETECTED) FOR MORE THAN 15 SECONDS. THE LOOP TROUBLE OR BEAM TROUBLE SHALL COME ON WHEN THERE IS A PROBLEM DETECTED ON THE VPDS OR CONTROLLER.

9. OVERSPEED, WRONG-WAY, AND DURESS ALARMS AND CAN EITHER BE BACK LIT WINDOWS OR RED INDICATING LIGHTS. PROVIDE AN ADJUSTABLE AUDIBLE ALARM. ALARMS. DURESS ALARMS SHALL BE ON OVERWATCH POSITION PANEL AND COMMAND & CONTROL MASTER CONTROL PANEL ONLY. SILENCE SWITCH CAN BE USED TO SILENCE AUDIBLE ALARMS. ALL OVERSPEED AND WRONG WAY ALARMS SHALL BE SELF CLEARING. DURESS ALARM DOES NOT NEED TO BE MONITORED AT THE MASTER CONTROL PANEL IF DONE BY ANOTHER PANEL IN THE COMMAND & CONTROL AREA.

10. AREA AROUND EFO SWITCH SHALL BE RED.

11. AUDIBLE ALARM, ALARM SHALL HAVE A MEANS TO ADJUST THE VOLUME.

12. PANEL ORIENTATION AND LABELING SHALL MATCH THE WAY THE GUARD VIEWS THE BARRIERS AND GUARD BOOTHS.

13. CONTROLS SHALL BE MADE SO THAT IF AN AVB IS IN TEST OR LOCAL MODE AND AN EFO IS PUSHED THEN TURNING THE THREE POSITION SWITCH TO EFO PRIOR TO AN EFO RESET SHALL NOT CAUSE THE AVB TO DEPLOY.

14. LOOP SAFETY. WHEN THE PRESENCE DETECTION LOOPS IN FRONT OF AND BEHIND THE BARRIER ARE MORE THAN 10 FEET APART, A SAFETY CIRCUIT MUST BE ADDED TO ENSURE THAT THE BARRIER WILL NOT CLOSE (DEPLOY) ON A VEHICLE THAT IS OVER THE BARRIER BUT BETWEEN THE LOOPS SO IS NOT DETECTED BY EITHER LOOP. THE FOLLOWING ARE APPROVED CIRCUITS:

   a. LATCHING CIRCUIT. WHEN A VEHICLE IS DETECTED BY LOOP 1, THE CONTROL LOGIC PICKS-UP AND SEALS ITSELF IN. AFTER THE VEHICLE PASSES OVER THE BARRIER IT SHOULD BE DETECTED BY LOOP 2 WHICH WILL DROP OUT RELAY FROM LOOP 1. LOOP RELEASE PUSHBUTTON IS REQUIRED TO DROPOUT RELAY LOOP 1 RELAY IN THE EVENT A VEHICLE IS DETECTED BY LOOP 1 BUT IS NOT DETECTED BY LOOP 2. IF THE VEHICLE PASSES OVER THE BARRIER BUT IS NOT DETECTED BY LOOP 2, THE LOOP 1 RELAY STAYS PICKED-UP EVEN THOUGH THERE IS NO VEHICLE OVER THE BARRIER. AFTER 15 SECONDS AT THIS CONDITION, AN ALARM SOUNDS TO ALERT THE GUARD THAT BARRIER'S LOOP CIRCUIT IS LATCHED. THE GUARD MUST VISUALLY CHECK THE BARRIER AND, IF THERE IS NOT A VEHICLE OVER IT, THE PUSH THE LOOP RELEASE TO DROP OUT THE RELAY AND CLEAR THE LOOP LATCH.
   b. TIME DELAY CIRCUIT. AN ALTERNATIVE TO THE LOOP LATCH CIRCUIT DESCRIBED ABOVE IS A CIRCUIT USING A SHORT (0.5 - 1 SECOND) TIME DELAY. A VEHICLE PASSING OVER LOOP 1 PICKS-UP A TIMER RELAY. AFTER THE VEHICLE CLEARS LOOP 1, THE TIMER EXTENDS THE 'ACTIVATION' OF LOOP 1 FOR THE TIME INDICATED. AFTER THE TIME EXPIRES, THEN LOOP 1 PER THE CONTROL LOGIC WILL LOOK LIKE IT IS CLEARED. THE ADDED TIME ALLOWS THE PASSING VEHICLE TO TRAVEL THE DISTANCE BETWEEN LOOPS 1 AND 2 BEFORE THE TIMER RUNS OUT. THE VEHICLE SHOULD BE DETECTED BY LOOP 2, WHICH WILL CONTINUE TO PREVENT BARRIER CLOSURE (DEPLOYMENT) UNTIL THE VEHICLE CLEARS LOOP 2.

15. PUSH BUTTONS WITH A CORRESPONDING INDICATING LIGHT ARE ALLOWED TO BE COMBINED INTO ONE DEVICE.

16. PICTOGRAPHS SHOWING UP/DOWN (CLOSED/OPEN) ARE TO BE PROVIDED BY THE PUSH BUTTONS. CONTROLS PANELS SHOW A 'WEDGE' STYLE IN THIS EXAMPLE. PICTOGRAPH SHALL MATCH THE ACTUAL TYPE OF BARRIER.

17. IF REMOTE MONITORING IS REQUIRED, THEN SEE SHEET E-111.

18. THE INBOUND AND OUTBOUND LOCAL PANELS CAN BE COMBINED INTO ONE PANEL IF THE LOCATION OF THE POWER UNITS ARE ADJACENT TO EACH OTHER.

19. OUT-OF-SERVICE SWITCH IS OPTIONAL.

20. OPERATING PANEL FOR THE SEARCH AREA PANEL - MOUNT IN A NEMA 4 LOCKABLE ENCLOSURE OR THE OPERATING PANEL MUST BE WEATHERPROOF.

21. IT IS ALLOWED TO USE OPEN/CLOSE INSTEAD OF UP/DOWN.

22. SPECIAL ALARM: WHEN TRAFFIC ARM IS NOT FULLY OPEN OR CLOSED FOR MORE THAN 5 SECONDS POSITION LIGHTS FLASH. WHEN GOING BACK TO AVB-UP OR AVB-DOWN & BARRIER AND TRAFFIC ARM IN INCORRECT POSITION THE MODE INDICATOR WILL FLASH.

23. ONE INDICATING LIGHT IS ALLOWED INSTEAD OF TWO INDICATING LIGHTS. CONFIGURATIONS WITH ONE LIGHT MUST BE RED AND ILLUMINATE WHEN SWITCH IS IN THE ARMED POSITION. IT IS ALLOWED TO HAVE THE SWITCH KEYED. IF KEYED ALL REMOTE EFOS CAN BE KEYED ALIKE OR DIFFERENTLY, BUT KEY(S) CANNOT MATCH THE OTHER KEYED SWITCHES.

24. IF ALLOWED IN THE CONTRACT, PROVIDE HARD CONTROL OR TOUCHSCREEN CONTROL FOR THE OPERATING PANELS; HOWEVER, EFO IS REQUIRED TO BE A DISCRETE HARD CONTROL SWITCH WITH A COVER IN BOTH CASES.

25. PLACE A PLACARD ON THE MASTER CONTROL PANEL WHICH STATES:

SPECIAL ALARMS:

OUT-OF-SERVICE	ALTERNATING UP/DOWN
MASTER EFO UP OR EFO DOWN LOCAL IN LOCAL MODE	MASTER EFO & LOCAL LIGHTS FLASHING
MASTER TEST MODE LOCAL IN LOCAL MODE	MASTER TEST & LOCAL LIGHTS FLASHING
MASTER PLACED EFO MODE UP OR EFO DOWN & AVBS INCORRECT	MASTER EFO MODE LIGHT FLASH
TRAFFIC ARM POSITION FAILURE	ALTERNATE UP/DOWN INDICATOR

26. THIS EFO OPERATING PANEL IS ONLY USED ON ARMY PROJECTS.

27. AIR FORCE. ON AIR FORCE PROJECTS, THE VISUAL ALARM IS NOT REQUIRED IF THE AUDIBLE ALARM PROVIDED.

28. OPTION. THIS IS NOT STANDARD, BUT AN ADDITIONAL KEYED SWITCH IS ALLOWED TO BYPASS THE SAFETY LOOP ON THE ACTIVE VEHICLE BARRIER SO THAT IT CAN BE LOWERED. THIS WOULD HAVE TO BE APPROVED BY THE INSTALLATION.

STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGEMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS.

US Army Corps of Engineers®
OMAHA DISTRICT

MARK	DESCRIPTION	DATE	APPR.
MARK	DESCRIPTION	DATE	APPR.

DESIGNED BY: MARK T. McNAMARA, PE	DATE: FEBRUARY 2021		
DWN BY: S.A.S.	CKD BY: M.T.M.,PE	SOLICITATION NO.: Z	
SUBMITTED BY: STEVEN L OTT, PE	PLOT DATE:	CONTRACT NO.: Z	FILE NUMBER: Z
PLOT SCALE:		SIZE:	FILE NAME:

US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

HEPD 2015
AVB CONTROL PANELS

SHEET IDENTIFICATION
E-170
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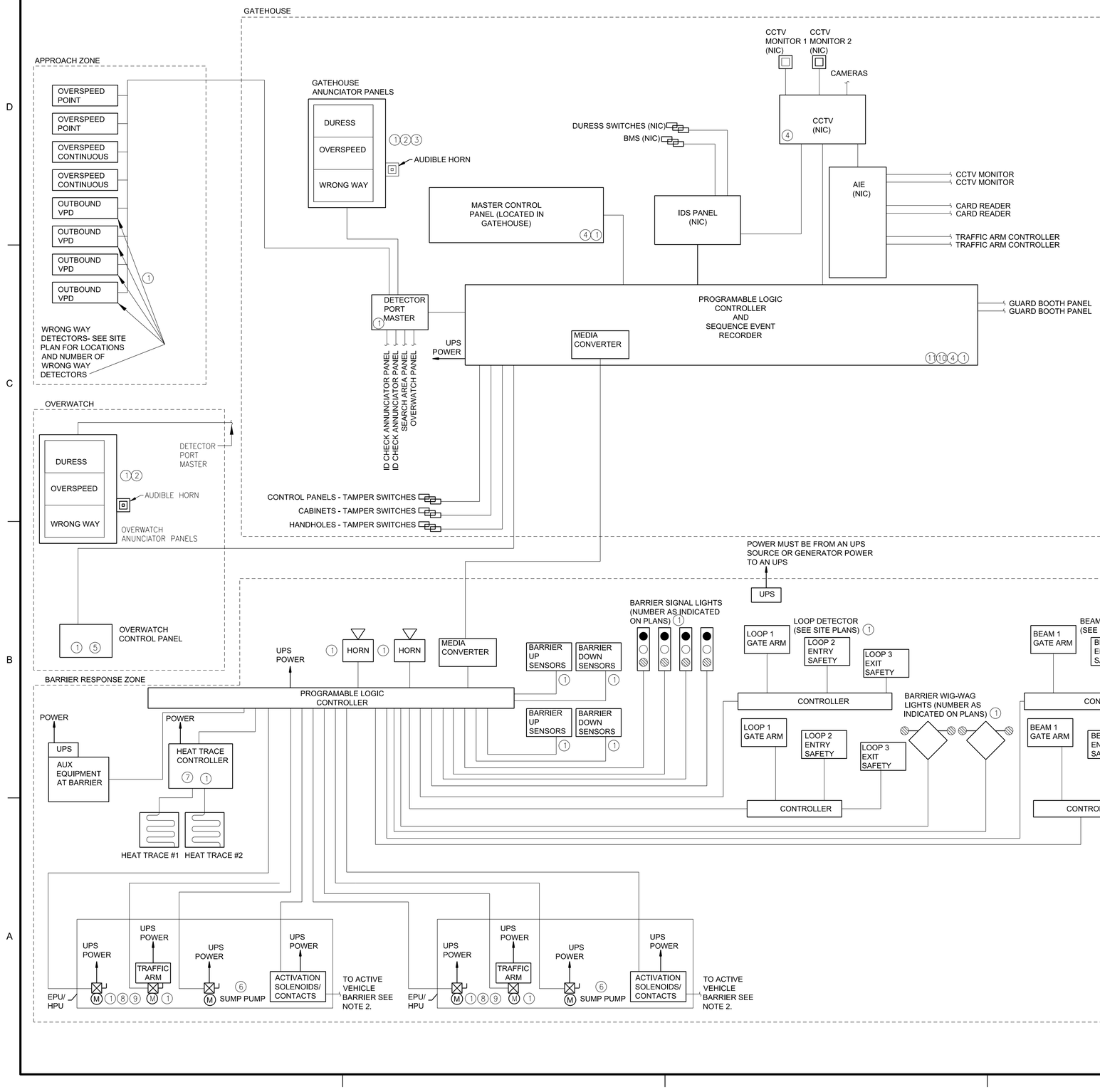
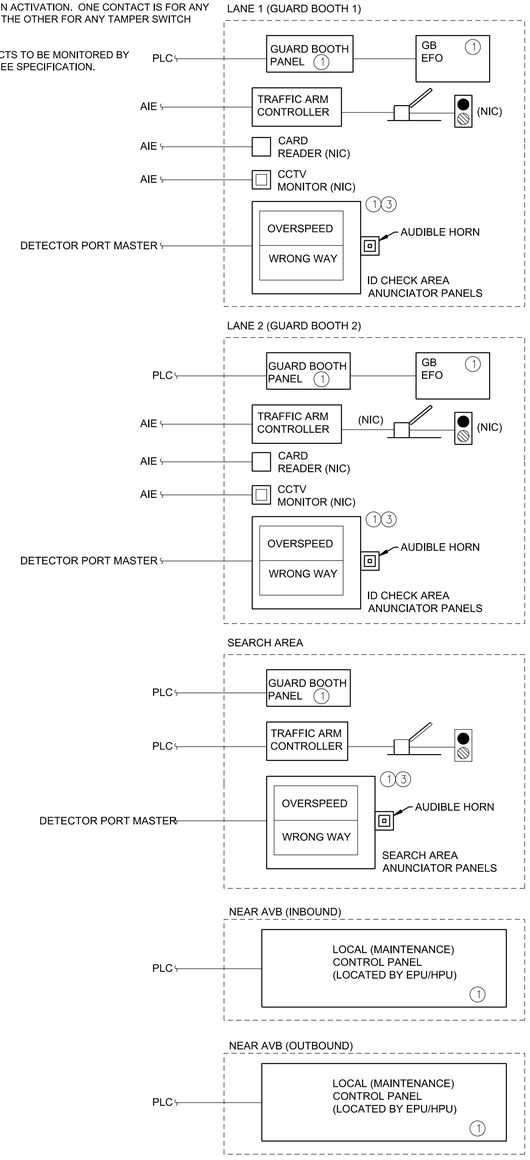


CONSTRUCTION NOTES

1. PROVIDE DEVICE AND ALL POWER AND CONTROL CONNECTIONS AS REQUIRED.
2. ANNUNCIATOR PANEL WITH AUDIBLE ALARM AND BACKLIT "WRONG WAY" & "DURESS" DISPLAY.
3. CAN BE PART OF MASTER CONTROL PANEL INSTEAD OF SEPARATE PANEL.
4. PROVIDE A DRY CONTACT FOR CCTV CAMERA CONNECTION.
5. PROVIDE A 20' CABLE FOR PANEL PORTABILITY IF AN OVERWATCH PAD INSTEAD OF A BOOTH. PROVIDE ALL CONNECTIONS AND APPURTENANCES AS REQUIRED.
6. OVERWATCH PANEL IS EITHER IN A BUILDING OR A PAVED PAD. PAVED PAD REQUIRES A LONG CORD AND PANEL LARGE ENOUGH TO LOCK THE PANEL IN IT.
7. BARRIER HEAT TAPE.
8. BARRIER EPU OR HPU. IF HPU MOTOR DOES NOT NEED UPS.
9. EPU'S SHALL BE PROVIDED WITH AN UPS THAT MATCHES THE MOTOR & MOTOR CONTROLLER CHARACTERISTICS.
10. PROVIDE TWO DRY CONTACTS TO BE MONITORED BY THE IDS PANEL. CONTACTS ARE NORMALLY OPEN AND WILL CHANGE TO NORMALLY CLOSED ON ACTIVATION. ONE CONTACT IS FOR ANY EFO ACTIVATION AND THE OTHER FOR ANY TAMPER SWITCH ACTIVATION.
11. PROVIDE DRY CONTACTS TO BE MONITORED BY THE CCTV SYSTEM. SEE SPECIFICATION.

GENERAL NOTES

1. SEE SITE PLANS FOR RELATIVE EQUIPMENT LOCATIONS. COORDINATE EXACT LOCATIONS WITH END USER PRIOR TO INSTALLATION.
2. INSTALL ALL EQUIPMENT PER MANUFACTURERS REQUIREMENTS. PROVIDE ALL CONDUIT, CONDUCTORS, CABLING, AND ALL ELECTRICAL APPURTENANCES AS REQUIRED FOR A COMPLETE AND FUNCTIONAL INSTALLATION. THIS INCLUDES ANY CHANGES TO CONDUCTORS, CONDUITS, PANELBOARDS, UPS AND GENERATOR.
3. SEE SPECIFICATIONS 34 71 13.19 CRASH RATED ACTIVE VEHICLE BARRIER AND CONTROLS FOR SPECIFIC REQUIREMENTS.
4. DIAGRAM IS FOR TWO AVBS, TWO GUARDBOOTHS, ONE SEARCH AREA, AN OVERWATCH, AND FIXED AIE. IF HANDHELD AIE THEN TRAFFIC ARMS/SIGNALS, REAR TAG CAMERA, AND CARD READER ARE NOT PROVIDED BY AIE. PROVIDE TRAFFIC ARMS/SIGNALS AS PART OF CONTRACT. DELETE DRIVER INTERFACE CARD READER. PROVIDE CONDUIT FOR A REAR TAG CAMERA. PEDESTRIAN BOOTH PANEL IS NOT SHOWN.



US Army Corps of Engineers
OMAHA DISTRICT

MARK	DESCRIPTION	DATE	APPR.

MARK	DESCRIPTION	DATE	APPR.

DESIGNED BY: M.MCNAMARA
DRWN BY: M.MCNAMARA
SUBMITTED BY: S.LINDGREN
CKD BY: J.MOENCH
DATE: FEBRUARY 2021
SOLICITATION NO.: Z
CONTRACT NO.: Z
PLOT SCALE:
PLOT DATE:
FILE NUMBER: Z
SIZE:
FILE NAME: E-111 HEPD AVB CONTROL SYS DIAGRAM.dgn

US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

HIGH EFFICIENCY PRESENCE DETECTION (HEPD) 2015 CONTROL SYSTEM DIAGRAM

SHEET IDENTIFICATION
E-171

HIGH EFFICIENCY PRESENCE DETECTION SAFTEY SCHEME - AVB UP

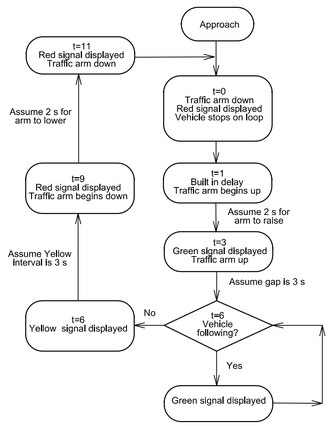
TRAFFIC CONTROL AND SAFETY AT ACTIVE BARRIERS		OPERATIONAL SEQUENCE PER SECOND (MIN FOR SAFETY - 40 KPH (25 MPH) DESIGN SPEED)											
	TIMELINE (SEC)	--	1	2	3	4	5	6	7	8	9	10	
	TRAFFIC CONTROL	NORMAL OPS	GUARD PERCEPTION AND REACTION TIME TO THREAT (BUTTON)			SYSTEM OPERATION AFTER EFO ACTIVATED				THREAT CONTAINED			
HEPD SAFETY SCHEME	WARNING SIGN WITH BEACONS	DARK/OFF	DARK/OFF			ALTERNATING FLASHING YELLOW							
	LED BLANK OUT SIGNS	DARK/OFF	DARK/OFF			ACTIVATED							
	TRAFFIC SIGNALS	SOLID RED/ NORMAL OPERATIONS	SOLID RED/ NORMAL OPERATIONS			SOLID RED							
	100 dB HORN (ADJUSTABLE)	SILENT	SILENT			ACTIVATED							
	TRAFFIC ARM WITH NO TRAFFIC IN SYSTEM	DEPLOYED (DOWN/CLOSED)	DEPLOYED (DOWN/CLOSED)										
	AVB WITH NO TRAFFIC IN SYSTEM	DEPLOYED (UP/CLOSED)	DEPLOYED (UP/CLOSED)										
	BARRIER LIGHTS	FLASHING RED	ON - FLASHING RED										

HIGH EFFICIENCY PRESENCE DETECTION SAFTEY SCHEME - AVB DOWN

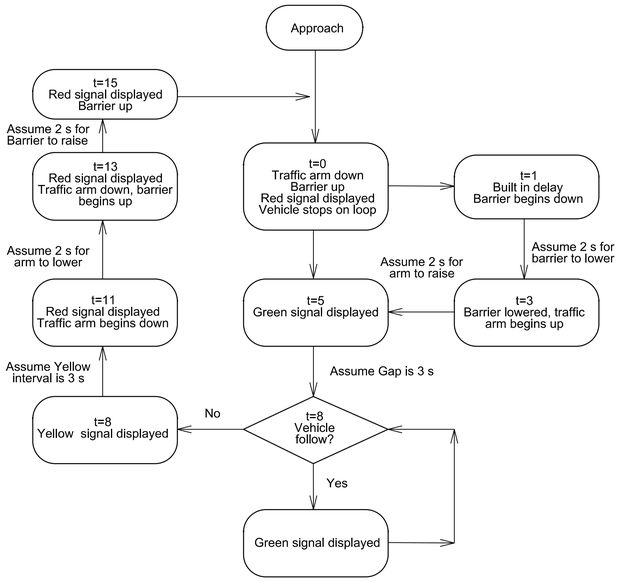
TRAFFIC CONTROL AND SAFETY AT ACTIVE BARRIERS		OPERATIONAL SEQUENCE PER SECOND (MIN FOR SAFETY - 40 KPH (25 MPH) DESIGN SPEED)											
	TIMELINE (SEC)	--	1	2	3	4	5	6	7	8	9	10	
	TRAFFIC CONTROL	NORMAL OPS	GUARD PERCEPTION AND REACTION TIME TO THREAT (BUTTON)			SYSTEM OPERATION AFTER EFO ACTIVATED				THREAT CONTAINED			
HEPD SAFETY SCHEME	WARNING SIGN WITH BEACONS	DARK/OFF	DARK/OFF			ALTERNATING FLASHING YELLOW							
	LED BLANK OUT SIGNS	DARK/OFF	DARK/OFF			ACTIVATED							
	TRAFFIC SIGNALS	SOLID RED/ NORMAL OPERATIONS	SOLID RED/ NORMAL OPERATIONS			SOLID RED							
	100 dB HORN (ADJUSTABLE)	SILENT	SILENT			ACTIVATED							
	TRAFFIC ARM WITH NO TRAFFIC IN SYSTEM	DEPLOYED (DOWN/CLOSED)	DEPLOYED (DOWN/CLOSED)										
	AVB WITH NO TRAFFIC IN SYSTEM	DOWN/OPEN	DOWN/OPEN			DEPLOYING				DEPLOYED (UP/CLOSED)			
	BARRIER LIGHTS	DARK/OFF	DARK/OFF			ON - FLASHING RED							

HIGH EFFICIENCY PRESENCE DETECTION SAFTEY SCHEME - WHILE PROCESSING TRAFFIC

TRAFFIC CONTROL AND SAFETY AT ACTIVE BARRIERS		OPERATIONAL SEQUENCE PER SECOND (MIN FOR SAFETY - 40 KPH (25 MPH) DESIGN SPEED)											
	TIMELINE (SEC)	--	1	2	3	4	5	6	7	8	9	10	
	TRAFFIC CONTROL	NORMAL OPS	GUARD PERCEPTION AND REACTION TIME TO THREAT (BUTTON)			SYSTEM OPERATION AFTER EFO ACTIVATED				THREAT CONTAINED			
HEPD SAFETY SCHEME	WARNING SIGN WITH BEACONS	DARK/OFF	DARK/OFF			ALTERNATING FLASHING YELLOW							
	LED BLANK OUT SIGNS	DARK/OFF	DARK/OFF			ACTIVATED							
	TRAFFIC SIGNALS	NORMAL OPERATIONS	NORMAL OPERATIONS			SOLID YELLOW		SOLID RED					
	100 dB HORN (ADJUSTABLE)	SILENT	SILENT			ACTIVATED							
	TRAFFIC ARM WITH TRAFFIC IN SYSTEM	NORMAL OPERATIONS	NORMAL OPERATIONS			DEPLOYING		DEPLOYED (DOWN/CLOSED)					
	AVB WITH TRAFFIC IN SYSTEM	NON-DEPLOYED (DOWN/OPEN)	NON-DEPLOYED (DOWN/OPEN)					DEPLOYING		DEPLOYED (DOWN/CLOSED)			
	BARRIER LIGHTS	DARK/OFF	DARK/OFF			ON - FLASHING RED							



PROCESS FLOWCHART FOR NORMAL OPERATIONS - BARRIERS NORMALLY DOWN



PROCESS FLOWCHART FOR NORMAL OPERATIONS - BARRIERS NORMALLY UP

PROVIDE 3"-4" HIGH RED LED LETTERING IN A WEATHERPROOF ENCLOSURE. THE WORDING 'OVERSPEED' OR 'WRONG WAY' SHALL ILLUMINATE INDEPENDENTLY. PROVIDE AN AUDIBLE DEVICE WITH A MEANS TO ADJUST THE VOLUME. SEE NOTE 6.

2 TY602GN NOT TO SCALE — OVERSPEED & WRONG WAY WARNING ANNUNCIATOR

GENERAL NOTES:

1. NOT USED.

2. 100 dB HORN SHALL BE ADJUSTABLE. HORN IS TO SOUND FOR 10 SECONDS AFTER THE EFO IS PUSHED AND THEN TURN OFF.

4. IN-PAVEMENT LIGHTS ARE ONLY REQUIRED IF THE ACTIVE VEHICLE BARRIER DOES NOT HAVE BARRIER LIGHTS. IF PROVIDED, THE LIGHTS ARE ONLY ON WHEN THE TRAFFIC SIGNAL IS RED.

5. ACTIVE VEHICLE BARRIER LIGHTS ACTIVATE WHEN THE BARRIER IS NOT FULLY DOWN/CLOSED.

6. PROVIDE AT THE ID CHECK CANOPY. A MINIMUM OF ONE PER TWO LANES MOUNTED ON COLUMN NEAR ENTRANCE TO ID CHECK AREA. IT IS OPTIONAL TO HAVE ONE MOUNTED IN THE SEARCH AREA.

US Army Corps of Engineers
OMAHA DISTRICT

MARK	DESCRIPTION	DATE	APPR.

MARK	DESCRIPTION	DATE	APPR.

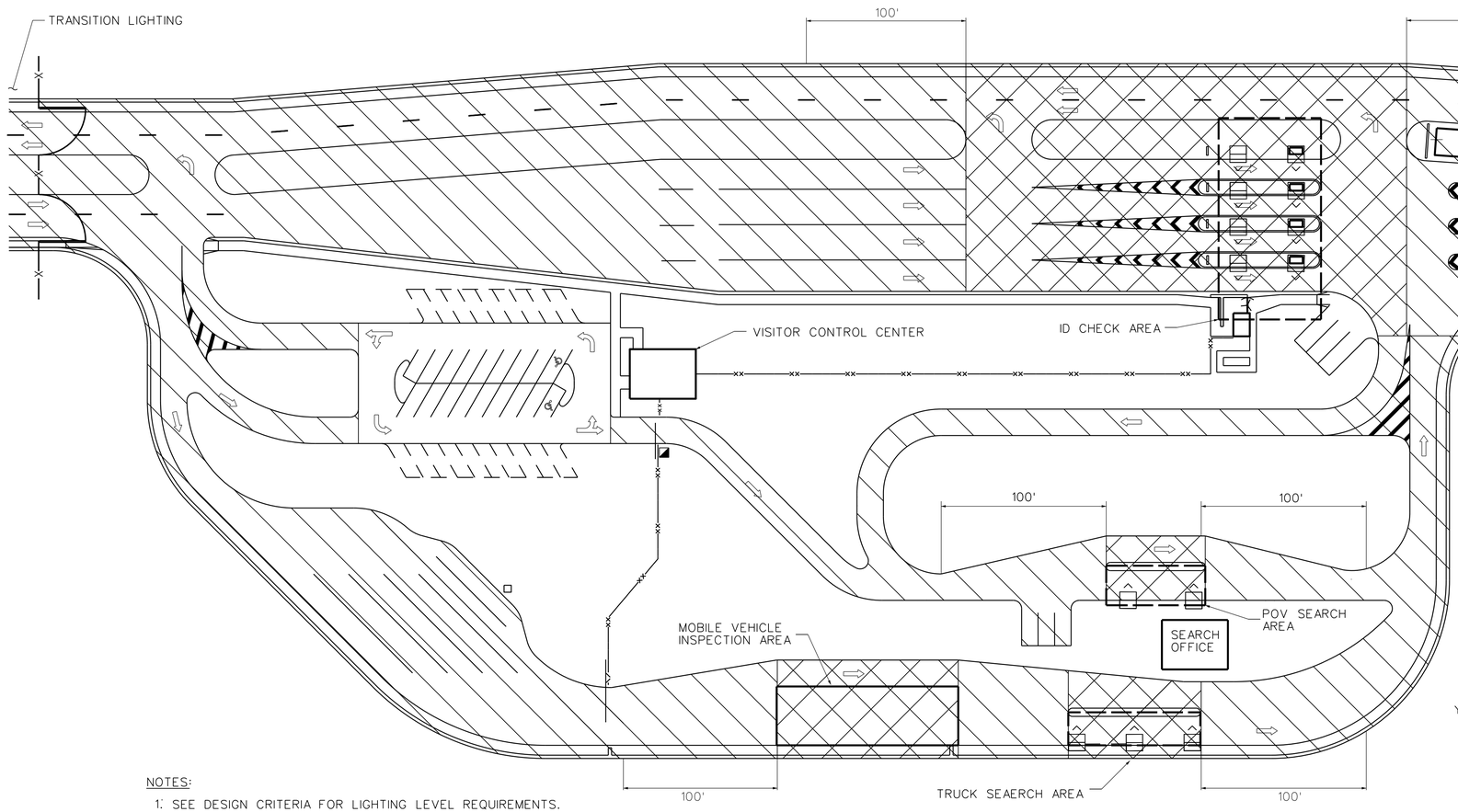
US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

DESIGNED BY: M.MCNAMARA
DRWN BY: M.MCNAMARA
CKD BY: J.MOENCH
SUBMITTED BY: S.LINDGREN
PLOT SCALE:
PLOT DATE:
DATE: FEBRUARY 2021
SOLICITATION NO.: Z
CONTRACT NO.: Z
FILE NUMBER: Z
SIZE:
FILE NAME: E-112 HEPD AVB CTRL SEQUENCE AND DETAILS.dgn

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

HIGH EFFICIENCY PRESENCE DETECTION (HEPD) 2015 CONTROL SEQUENCE & DETAILS

SHEET IDENTIFICATION
E-112



LEGEND

- APPROACH & RESPONSE ZONES LIGHT LEVEL REQUIREMENTS
- ACCESS CONTROL/SEARCH ZONE LIGHT LEVEL
- TRAFFIC FLOW PATTERN
- Y/100mm (4") PAINT STRIPE STYLE/WIDTH
- DY DOUBLE YELLOW LINE
- TRAFFIC ARM
- ACTIVE VEHICLE BARRIER
- PASSIVE VEHICLE BARRIER
- ORNAMENTAL FENCE
- BOLLARDS
- CANOPY
- BARRIER WALL
- DOUBLE FACE GUARD RAIL
- SINGLE FACE GUARD RAIL
- GUARD BOOTH
- GENERATOR PAD W/SIDEWALK
- CURB RAMP

NOTES:

1. SEE DESIGN CRITERIA FOR LIGHTING LEVEL REQUIREMENTS.
2. SEE DESIGN CRITERIA FOR DESCRIPTIONS OF REQUIREMENTS FOR COMMUNICATIONS, DURESS ALARMS, INTRUSION DETECTION SENSORS, SPEED DETECTORS, WRONG-WAY DETECTORS, VEHICLE PRESENCE DETECTORS, AND ACTIVE VEHICLE BARRIER CONTROLS.
3. SIZE CONDUCTORS FOR MAXIMUM 3% VOLTAGE DROP AND MAXIMUM AMPERES.
4. SPECIFY CUTOFF TYPE LUMINAIRES TO REDUCE GLARE AND LIGHT TRESPASS.
5. LUMINAIRES SHOULD BE LOCATED PERPENDICULAR TO ROADWAY PAVEMENT UNLESS INDICATED OTHERWISE.
6. LOCATE POLES 0.6m (2') CLEAR FACE OF CURB OR AT BACK EDGE OF SIDEWALK OR 1.5m (5') FROM EDGE OF PAVEMENT OR SHOULDER.
7. FOR ANY UNPROTECTED POLES LOCATED INSIDE THE AASHTO CLEAR ZONE, PROVIDE POLES WITH BREAKAWAY BASES.
8. FOR ANY POLES LOCATED BEHIND GUARDRAIL, PROVIDE CLEARANCE FOR THE REQUIRED AASHTO GUARDRAIL DEFLECTION.
9. SPECIFY JUNCTION BOXES SIZED FOR SUFFICIENT SPACE TO MAKE REQUIRED CABLE CONNECTIONS. PROVIDE CONCRETE JUNCTION BOXES WITH TAMPER PROOF HARDWARE.
10. SPECIFY WATERTIGHT, SUBMERSIBLE, NON-FUSIBLE, PREMOLDED, DISCONNECTABLE CONNECTOR KITS FOR SPLICES IN JUNCTION BOXES.
11. TRANSITION LIGHTING IS REQUIRED ANYWHERE WHERE ONE HAS A CHANGE OF LIGHT LEVEL REQUIRED. TRANSITION LIGHTING NEEDS TO EXTEND PAST THE END OF THE RESPONCE ZONE DOWN TO THE LOCAL STREET LIGHT LEVEL.
12. ACCESS CONTROL/SEARCH ZONE LUMINAIRES PLUS THOSE LUMINAIRES LOCATED 100FT BEFORE AND AFTER ARE TO BE ON GENERATOR BACKUP.

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US Army Corps of Engineers®
OMAHA DISTRICT

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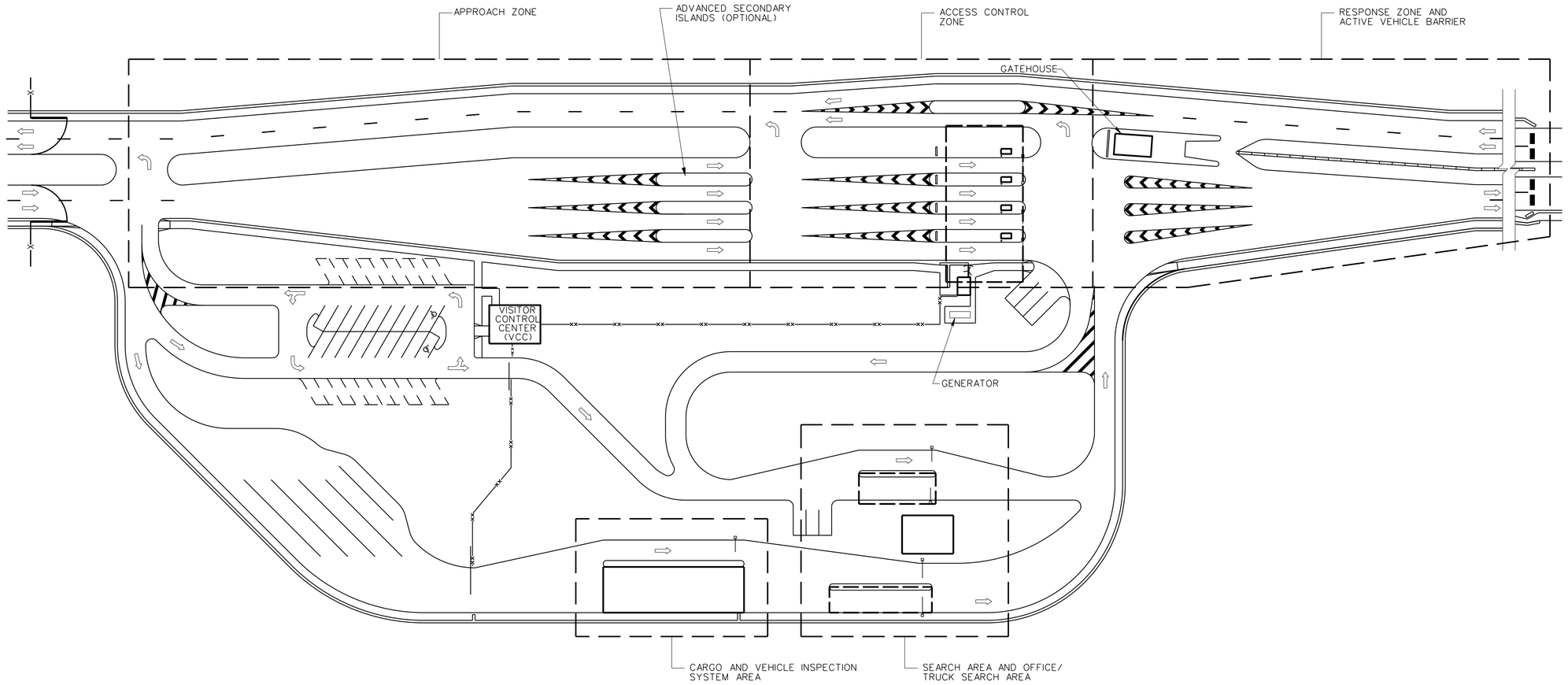
DESIGNED BY: MTM
DWN BY: SAS
CKD BY: SLO
SUBMITTED BY: S.LINDGREN
DATE: FEBRUARY 2021
SOLICITATION NO.: Z
CONTRACT NO.: Z
FILE NUMBER: Z
PLOT SCALE:
PLOT DATE:
SIZE:
FILE NAME: EL101 LIGHTING PLAN.dgn

US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

LIGHTING PLAN

SHEET IDENTIFICATION
EL101
48



POWER REQUIREMENTS

NOT TO SCALE

AREA	VA - CONNECTED			VA - DEMAND		
	UTILITY	GENERATOR	UPS	UTILITY	GENERATOR	UPS
APPROACH ZONE	7120.0	7120.0	2400.0	7120.0	7120.0	2400.0
ADVANCE (SECONDARY) ISLANDS	6240.0	6240.0	1200.0	1440.0	1440.0	1200.0
ACCESS CONTROL ZONE	32632.2	23919.2	9020.0	16992.2	16079.2	5980.0
GATEHOUSE	15184.6	8343.6	6934.0	11704.6	8343.6	6934.0
RESPONSE ZONE AND ACTIVE VEHICLE BARRIER	22578.0	22578.0	18550.0	4098.0	4098.0	70.0
OVERWATCH POSITION	2430.8	1276.8	1056.0	1710.8	1276.8	1056.0
VISITOR CONTROL CENTER (VCC)	24730.2	8555.2	3864.0	15740.2	8555.2	3864.0
SEARCH AREA AND OFFICE	38860.2	25685.2	6180.0	30910.2	23725.2	5420.0
TRUCK SEARCH AREA	8482.0	8482.0	830.0	7722.0	7722.0	70.0
CARGO AND VEHICLE INSPECTION SYSTEM AREA	100000.0	0.0	0.0	100000.0	0.0	0.0
ALL	258258.0	112200.0	50034.0	197438.0	78360.0	26994.0

NOTES:

1. POWER REQUIREMENTS PER ACP CRITERIA REQUIREMENTS AND STANDARD DRAWINGS.
2. BACKUP POWER & UPS REQUIREMENTS PER ACP CRITERIA (APPENDIX B).
3. DESIGNER TO VERIFY UPS INTERFACE CAPABILITIES.
4. PHYSICAL LOCATION(S) AND SIZE OF UPS(S) SHALL BE DETERMINED BY THE ELECTRICAL DESIGNER.
5. SEE APPENDIX F FOR DETAILED LIST OF ELECTRICAL LOADS.

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US Army Corps of Engineers®
OMAHA DISTRICT

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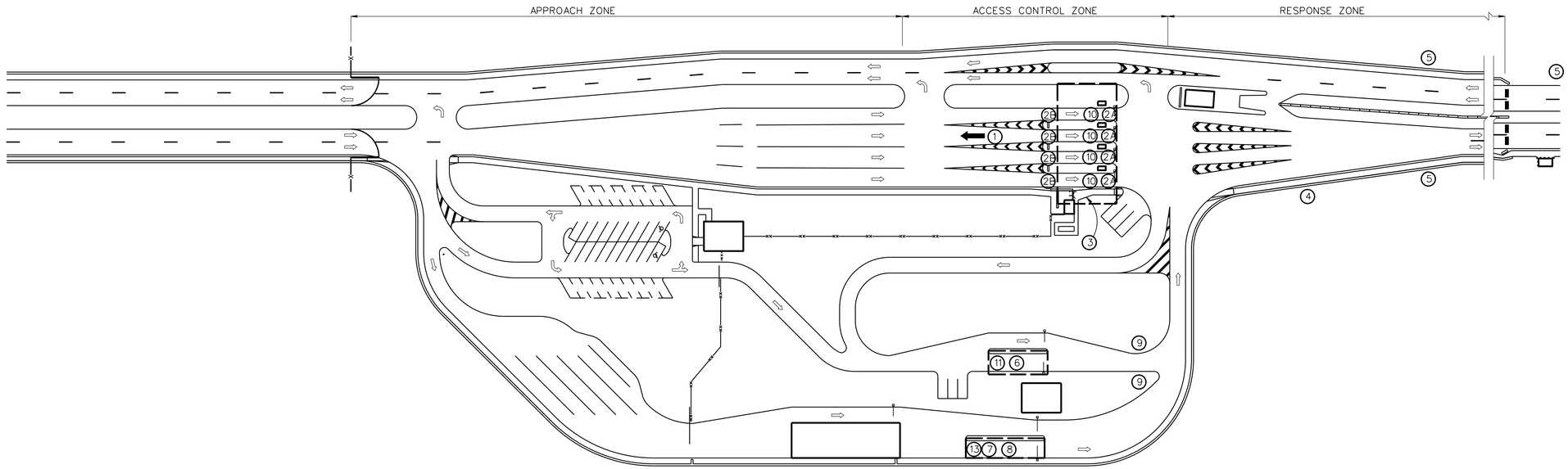
DWN BY: M.MCNAMARA
SUBMITTED BY: S.LINDGREN
CKD BY: J.MOENCH
DATE: FEBRUARY 2021
SOLICITATION NO.: Z
CONTRACT NO.: Z
PLOT DATE:
FILE NUMBER: Z
PLOT SCALE:
SIZE:
FILE NAME: EP101 ELECTRICAL PLAN POWER REQ.dgn

US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

ELECTRICAL PLAN POWER REQUIREMENTS

SHEET IDENTIFICATION
EP101



PRIMARY ACP WITH VCC AND COMMERCIAL VEHICLE

ZONE/FACILITY	NUMBER	DESCRIPTION	VIEW	CAMERA LOCATION	MONITOR LOCATION	LOCATION TYPE	NUMBER OF CAMERAS	FIXED OR PTZ
APPROACH ZONE	①	APPROACH ZONE OVERWATCH	VIEW APPROACHING TRAFFIC	POLE OR CANOPY ROOF	GATEHOUSE	EXTERNAL	1 OR 2 (SEE NOTE 1)	FIXED
ID CHECK AREA	②A	LANE OPERATIONS	DRIVER, VEHICLE, AND ID CHECK GUARD	UNDERSIDE OF CANOPY OR ON COLUMN	GATEHOUSE	COVERED	1 PER LANE	FIXED
	②B	REAR LICENSE PLATE	REAR LICENSE PLATE	PRIMARY ISLANDS	TBD	COVERED	1 PER LANE (SEE NOTE 2)	FIXED
	③	PEDESTRIAN ID CHECK OPERATIONS	PEDESTRIAN GUARD BOOTH AND PEDESTRIAN ACTIVE BARRIER	UNDERSIDE OF CANOPY	GATEHOUSE	COVERED	1	FIXED
	④	ID CHECK AREA OVERWATCH	ID CHECK AREA, TURNAROUND, AND SEARCH AREA ENTRANCE/EXIT	POLE OR GATEHOUSE ROOF	CENTRAL SECURITY MONITORING STATION	EXTERNAL	1	PTZ
	⑩	DRIVER	DRIVER	PRIMARY ISLAND	GATEHOUSE	COVERED	1 PER LANE (SEE NOTE 2)	FIXED
RESPONSE ZONE	⑤	FINAL BARRIER OVERWATCH	FINAL BARRIERS AND TRAFFIC SIGNAL	POLE	GATEHOUSE	EXTERNAL	2 OR 3 (SEE NOTE 6)	FIXED
PASSENGER VEHICLE SEARCH AREA	⑥	SEARCH OPERATIONS	DRIVER, VEHICLE, AND SEARCH AREA GUARD	UNDERSIDE OF CANOPY	GATEHOUSE	COVERED	1 PER LANE	FIXED
TRUCK SEARCH AREA	⑪	SEARCH OPERATIONS	REAR LICENSE PLATE	ISLAND	GATEHOUSE	COVERED	1 PER LANE	FIXED
	⑦	SEARCH OPERATIONS	DRIVER, VEHICLE, AND SEARCH AREA GUARD	UNDERSIDE OF CANOPY	GATEHOUSE	COVERED	1 PER LANE	FIXED
	⑬	SEARCH OPERATIONS	REAR LICENSE PLATE	ISLAND	GATEHOUSE	COVERED	1 PER LANE	FIXED
	⑧	AID SEARCH AREA GUARDS - OPTIONAL (SEE NOTE 3)	TOP OF VEHICLE BEING SEARCHED	UNDERSIDE OF CANOPY	SEARCH AREA	COVERED	1	PTZ
SEARCH AREA	⑨	SEARCH AREA OVERWATCH	SEARCH AREAS	POLE	GATEHOUSE	EXTERNAL	1 (SEE NOTE 4)	PTZ
						TOTAL	22-25 ** FOR 4 LANE ENTRANCE	

NOTES:

1. AN ADDITIONAL CAMERA MAY BE REQUIRED TO VIEW APPROACH ZONE FOR PEDESTRIANS.
2. PROVIDE CONDUIT ONLY FOR FUTURE CAMERA IF PROJECT WILL GET AUTOMATION INSTALLATION ENTRY. ARMY PROJECTS.
3. OPTIONAL CAMERA TO AID SEARCH AREA GUARDS.
4. MAY REQUIRE 2 CAMERAS IF TRUCK AND PASSENGER VEHICLE SEARCH AREAS CANNOT BE COVERED BY ONE CAMERA.
5. SEE DESIGN CRITERIA (APPENDIX B) FOR DESCRIPTION OF CCTV REQUIREMENTS.
6. DIVIDED LANES AT THE AVB LOCATION NEED 3 CAMERAS; OTHERWISE 2 IS SUFFICIENT. IF 2 CAMERAS, NEED ONE EACH SIDE OF THE AVB. CAMERAS MUST SEE BARRIER AND TRAFFIC SIGNAL.
7. CAMERA PLAN INTENDED TO PROVIDE INITIAL GUIDANCE PER POLICY REQUIREMENTS. LOCATIONS ARE APPROXIMATE. ACTUAL LOCATIONS AND NUMBER OF CAMERAS TO BE DETERMINED BASED ON SITE CONDITIONS AND LEVEL OF NEED.

** 16-19 FOR 2 LANE ENTRANCE
19-22 FOR 3 LANE ENTRANCE

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US Army Corps of Engineers®
OMAHA DISTRICT

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US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

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DRWN BY: M.MCNAMARA
CKD BY: J.MOENCH
SUBMITTED BY: S.LINDGREN
PLOT SCALE:
PLOT DATE:
DATE: FEBRUARY 2021
SOLICITATION NO.: Z
CONTRACT NO.: Z
FILE NUMBER: Z
SIZE:
FILE NAME: EY101 CCTV CAMERA PLAN.dgn

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

CCTV CAMERA PLAN

SHEET IDENTIFICATION
EY101
53

DURESS SWITCHES

DIESEL-GEN TROUBLE

IDS

OVERSPEED DETECTORS

WRONG WAY DETECTORS

TAMPER SWITCHES

ACP CCTV CAMERAS

CCTV IMAGE DATA

ALARMS FOR CCTV PRESETS

CENTRAL SECURITY MONITORING SYSTEM

LOCAL INTERFACE PANEL AT ACP FOR THE INSTALLATION CENTRAL SECURITY MONITORING SYSTEM

EFO

DURESS

PROGRAMMABLE LOGIC CONTROLLER

OS & WW ALARMS FOR CCTV PRESETS

CCTV SUBSYSTEM

IN PAVEMENT LIGHTS

VEHICLE PRESENCE DETECTOR (VPD) INPUTS

TRAFFIC ARM CONTROL & STATUS

WIG-WAG SIGNAL CONTROL

TRAFFIC SIGNAL CONTROL

AVB CONTROL, STATUS & TROUBLE

OS, WW & DURESS

AVB CONTROL SWITCHES & INDICATING LIGHTS

GUARD BOOTH, SEARCH AREA, AND OVERWATCH POSITION CONTROL PANEL

EFO SWITCH
INDICATING LIGHTS
ANNUNCIATION
WINDOWS FOR:

OVERSPEED (NOTE 1)

WRONG WAY (NOTE 1)

DURESS (NOTES 1 & 2)

COMMAND & CONTROL

CCTV MONITOR 1	CCTV MONITOR 2

ALARM ANNUNCIATOR (SEE NOTES)

MASTER CONTROL PANEL

AVB CONTROL SWITCHES
INDICATING LIGHTS
ANNUNCIATION WINDOWS FOR:

OVERSPEED (NOTE 1)

WRONG WAY (NOTE 1)

DURESS (NOTES 1 & 3)

AVB's

CLOSE ACTIVATOR
OPEN ACTIVATOR
EFO ACTIVATOR
CLOSE STATUS
OPEN STATUS
AVB LIGHTS
AVB TROUBLE/MALFUNCTION

AVB MODE SW
AVB CLOSE SW
AVB OPEN SW
INDICATING LIGHTS

LOCAL CONTROL PANEL

TRAFFIC SIGNALS

RED
YELLOW
GREEN

WIG-WAG WARNING SIGNAL

TRAFFIC ARM(S) (PRESENCE DETECTION SAFETY SYSTEM ONLY)

CLOSE COMMAND
OPEN COMMAND
CLOSE STATUS
OPEN STATUS

VEHICLE PRESENCE DETECTORS (VPD's) (DEPENDING ON SYSTEM)

LOOPS
OR
LOOPS & BEAMS

VPD TROUBLE
LOOP TROUBLE
BEAM TROUBLE
VPD ON
LOOP ON
BEAM ON

NOTES
1. ADJUSTABLE AUDIBLE ALARM AND BACKLIT VISUAL ALARM.
2. OVERWATCH POSITION ONLY.
3. DURESS ALARM SHALL NOT BE AUDIBLE OUTSIDE OF GATEHOUSE.
4. THIS DRAWING SHOWS THE MAJOR COMPONMENTS OF THE ACTIVE VEHICLE BARRIER CONTROL SYSTEM (AVBCS) AND A REPRESENTATION OF THE COMMUNICATIONS LINKS BETWEEN COMPONENTS. THE DESIGNER SHALL COORDINATE WITH THE INSTALLATION AND THE INSTALLATION'S CENTRAL SECURITY MONITORING SYSTEM (CSMS) CONTRACTOR TO DETERMINE THE INTERFACE REQUIREMENTS BETWEEN THE AVBCS AND THE CSMS. THE DESIGNER SHALL THEN EDIT THIS DRAWING TO REFLECT THE REQUIRED COMMUNICATIONS LINKS AMONG THE VARIOUS AVBCS COMPONENTS AND THE CSMS.
5. ALARM ANNUNCIATOR ONLY NEEDED IF LOCAL INTERFERENCE PANEL NOT AT THE COMMAND & CONTROL LOCATION.

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DATE: FEBRUARY 2021
SOLICITATION NO.: Z
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FILE NUMBER: Z
FILE NAME: EY102 AVB BLOCK DIAGRAM.dgn

US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

ACTIVE VEHICLE BARRIER CONTROL SYSTEM (GENERAL) CONFIGURATION

SHEET IDENTIFICATION
EY102
60

INDEX

GENERAL

DESIGN FILE	SHEET NO.	DESCRIPTION
COS-ACP-G-001.DWG	G-001	COVER SHEET
COS-ACP-G-002.DWG	G-002	INDEX

CIVIL/SITE

DESIGN FILE	SHEET NO.	DESCRIPTION
COS-ACP-C-001.DWG	C-001	GENERAL NOTES
COS-ACP-C-301.DWG	C-301	SITE PLAN-PRIMARY ACP WITH VCC AND COMMERCIAL VEHICLE ACCESS
COS-ACP-C-302.DWG	C-302	SITE PLAN-PRIMARY/SECONDARY ACP WITH VCC
COS-ACP-C-303.DWG	C-303	SITE PLAN-PRIMARY/SECONDARY ACP WITHOUT VCC
COS-ACP-C-304.DWG	C-304	SITE PLAN-LIMITED USE ACP
COS-ACP-C-901.DWG	C-901	SITE PLAN-ACP DETAILS
COS-ACP-C-902.DWG	C-902	SITE PLAN-TYPICAL SECTIONS
COS-ACP-C-903.DWG	C-903	SITE PLAN-GATES AND FENCES
COS-ACP-C-904.DWG	C-904	SITE PLAN-PAVEMENT MARKING DETAILS

ARCHITECTURAL

DESIGN FILE	SHEET NO.	DESCRIPTION
COS-ACP-A-101CS.RVT	A-101CS	CONCEPTUAL COMMAND & CONTROL W/ SEARCH FLOOR PLAN
COS-ACP-A-101GB.RVT	A-101GB	CONCEPTUAL GUARD BOOTH AND PEDESTRIAN ID CHECK LAYOUT
COS-ACP-A-101GH.RVT	A-101GH	CONCEPTUAL GATEHOUSE LAYOUT
COS-ACP-A-101ID.RVT	A-101ID	CONCEPTUAL ID CHECK LAYOUT
COS-ACP-A-101O.RVT	A-101O	CONCEPTUAL OVERWATCH & OVERWATCH W/ COMMAND & CONTROL LAYOUT
COS-ACP-A-101POV.RVT	A-101POV	CONCEPTUAL CONCEPTUAL PASSENGER VEHICLE SEARCH CANOPY LAYOUT
COS-ACP-A-101S1.RVT	A-101S1	CONCEPTUAL SMALL SEARCH AREA BUILDING LAYOUT
COS-ACP-A-101S2.RVT	A-101S2	CONCEPTUAL LARGE SEARCH AREA BUILDING LAYOUT
COS-ACP-A-201S2.RVT	A-201S2	CONCEPTUAL LARGE SEARCH AREA BUILDING ELEVATIONS
COS-ACP-A-101T.RVT	A-101T	CONCEPTUAL TRUCK SEARCH AREA CANOPY LAYOUT
COS-ACP-A-101V2.RVT	A-101V2	CONCEPTUAL 2 PROCESSOR VISITOR CONTROL CENTER LAYOUT
COS-ACP-A-101V3.RVT	A-101V3	CONCEPTUAL 3 PROCESSOR VISITOR CONTROL CENTER LAYOUT
COS-ACP-A-101V6.RVT	A-101V6	CONCEPTUAL 6 PROCESSOR VISITOR CONTROL CENTER LAYOUT

INTERIOR

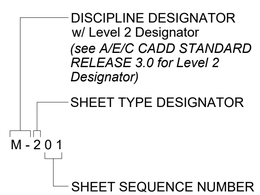
DESIGN FILE	SHEET NO.	DESCRIPTION
COS-ACP-I-101CS.RVT	I-101CS	FURNITURE FLOOR PLAN
COS-ACP-I-101GB.RVT	I-101GB	CONCEPTUAL GUARD BOOTH AND PEDESTRIAN ID CHECK FURNITURE PLAN
COS-ACP-I-101GH.RVT	I-101GH	FURNITURE FLOOR PLAN
COS-ACP-I-101O.RVT	I-101O	FURNITURE FLOOR PLAN
COS-ACP-I-101S1.RVT	I-101S1	FURNITURE FLOOR PLAN
COS-ACP-I-101S2.RVT	I-101S2	FURNITURE FLOOR PLAN
COS-ACP-I-101V2.RVT	A-101V2	FURNITURE FLOOR PLAN
COS-ACP-I-101V3.RVT	A-101V3	FURNITURE FLOOR PLAN
COS-ACP-I-101V6.RVT	A-101V6	FURNITURE FLOOR PLAN

ELECTRICAL

DESIGN FILE	SHEET NO.	DESCRIPTION
ACP-STDE-100O.DGN	E-100O	OVERWATCH AVB OPERATING PANEL PEDESTAL DETAIL
ACP-STDE-101.DGN	E-101	HYBRID BEACON AVB CONTROL PANELS
ACP-STDE-102.DGN	E-102	HYBRID BEACON CONTROL SYSTEM DIAGRAM
ACP-STDE-103.DGN	E-103	HYBRID BEACON CONTROL SEQUENCE AND DETAILS
ACP-STDE-110.DGN	E-110	HIGH EFFICIENCY PRESENCE DETECTION (HEPD) AVB CONTROLPANELS
ACP-STDE-111.DGN	E-111	HIGH EFFICIENCY PRESENCE DETECTION (HEPD) CONTROL SYSTEM DIAGRAM
ACP-STDE-112.DGN	E-112	HIGH EFFICIENCY PRESENCE DETECTION (HEPD) CONTROL SEQUENCE AND DETAILS
ACP-STDE-120.DGN	E-120	HYBRID BEACON AND STOP CONTROL AVB CONTROL PANELS
ACP-STDE-121.DGN	E-121	HYBRID BEACON AND STOP CONTROL SYSTEM DIAGRAM
ACP-STDE-122.DGN	E-122	HYBRID BEACON AND STOP CONTROL SEQUENCE AND DETAILS
ACP-STDE-130.DGN	E-130	STOP CONTROL AVB CONTROL PANELS
ACP-STDE-131.DGN	E-131	STOP CONTROL - CONTROL SYSTEM DIAGRAM
ACP-STDE-132.DGN	E-132	STOP CONTROL - CONTROL SEQUENCE AND DETAILS
ACP-STDE-140.DGN	E-140	FULL CONTAINMENT AVB CONTROL PANELS - MASTER
ACP-STDE-141.DGN	E-141	FULL CONTAINMENT AVB CONTROL PANELS - OTHER PANELS
ACP-STDE-142.DGN	E-142	FULL CONTAINMENT CONTROL SYSTEM DIAGRAM
ACP-STDE-143.DGN	E-143	FULL CONTAINMENT CONTROL SYSTEM DIAGRAMS W/ TRAFFIC ARMS
ACP-STDE-144.DGN	E-144	FULL CONTAINMENT CONTROL SYSTEM DIAGRAMS W/O TRAFFIC ARMS
ACP-STDE-150.DGN	E-150	NEW ISLAND TYPICAL PLAN AND ELEVATION FOR AIE
ACP-STDE-151.DGN	E-151	EXISTING ISLAND TYPICAL PLAN & ELEVATION
ACP-STDE-152.DGN	E-152	AIE FIXED BLOCK DIAGRAM
ACP-STDE-153.DGN	E-153	TYPICAL ISLAND TYPICAL PLAN & ELEVATION FOR AIE & OTHER SYSTEMS
ACP-STDE-154.DGN	E-154	AIE HANDHELD
ACP-STDE-155.DGN	E-155	AIE HANDHELD BLOCK DIAGRAM
ACP-STDE-160.DGN	E-160	CONVENTIONAL SIGNS AND SIGNAL AVB CONTROL PANELS
ACP-STDE-161.DGN	E-161	R/Y/G CONVENTIONAL SIGNS AND SIGNALS CONTROL SYSTEM DIAGRAM
ACP-STDE-162.DGN	E-162	HYBRID BEACON CONVENTIONAL SIGNS AND SIGNALS CONTROL SYSTEM DIAGRAM
ACP-STDE-163.DGN	E-163	CONVENTIONAL SIGNS AND SIGNALS CONTROL SEQUENCE AND DETAILS
ACP-STDE-170.DGN	E-170	HEPD 2015 AVB CONTROL PANELS
ACP-STDE-171.DGN	E-171	HEPD 2015 CONTROL SYSTEM DIAGRAM
ACP-STDE-172.DGN	E-172	HEPD 2015 CONTROL SEQUENCE & DETAILS
ACP-STDEL101.DGN	EL101	LIGHTING PLAN
ACP-STDEP101.DGN	EP101	GENERIC ELECTRICAL PLAN POWER REQUIREMENTS
ACP-STDEY101.DGN	EY101	CCTV CAMERA PLAN
ACP-STDEY102DGN	EY102	AVB BLOCK DIAGRAM

INDEX LEGEND:

1. SHEET IDENTIFICATION NUMBERS:



2. DISCIPLINE DESIGNATORS:

G	GENERAL
H	HAZARDOUS MATERIALS
V	SURVEY / MAPPING
B	GEOTECHNICAL
C	CIVIL
L	LANDSCAPE
S	STRUCTURAL
A	ARCHITECTURAL
I	INTERIORS
Q	EQUIPMENT
F	FIRE PROTECTION
P	PLUMBING
D	PROCESS
M	MECHANICAL
E	ELECTRICAL
T	TELECOMMUNICATIONS
R	RESOURCE

3. SHEET TYPE DESIGNATORS:

0	GENERAL
1	PLANS
2	ELEVATIONS
3	SECTIONS
4	LARGE-SCALE VIEWS
5	DETAILS
6	SCHEDULES & DIAGRAMS
7	USER DEFINED
8	USER DEFINED
9	3D REPRESENTATIONS

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OMAHA, NE 68102

VARIOUS LOCATIONS
3D BIM TRANSLATION
ARMY STANDARD DESIGN
ACCESS CONTROL POINT

INDEX

SHEET ID

G-002

APPENDIX K
ARMY ACP STANDARD DESIGN MANUAL

ARMY ACCESS CONTROL POINTS (ACPs) STANDARD DESIGN

VARIOUS LOCATIONS (CONUS AND OCONUS)

SEPTEMBER 2024

Prepared By:

US Army Corps of Engineers ®
Omaha District

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ARMY ACCESS CONTROL POINTS (ACPs) STANDARD DESIGN

1. INTRODUCTION 4

1.1. STANDARD DESIGN 4

1.2. ACP DEFINITION 4

1.3. ACP CLASSIFICATIONS 4

1.4. ACP FUNCTIONS 4

1.4.1. Site Functions 5
1.4.2. Building Functional Areas 5

1.5. MANDATORY CRITERIA 5

1.6. COORDINATING FACILITY TYPES 5

1.7. STANDARD DESIGN DRAWINGS AND INFORMATION 5

1.8. OUTSIDE CONTINENTAL UNITED STATES (OCONUS) 5

1.9. RFP WIZARD 6

2. SCOPE OF WORK 7

2.1. ACCESS CONTROL POINTS 7

2.2. TRAFFIC AND TRANSPORTATION ENGINEERING 7

2.2.1. Traffic Engineering Study (TES) 7
2.2.2. Transportation Engineering 8
2.2.3. Turning Movements 8

2.3. DEFEAT OF VEHICLE THREAT SCENARIOS 8

2.3.1. Office of Provost Marshal General (OPMG) Vehicle Threat Scenarios 8
2.3.2. Threat Vehicle Characteristics 9

2.4. GENERAL REQUIREMENTS 10

2.4.1. ID Check Area 10
2.4.2. Ballistic Resistance 10
2.4.3. Canopies 10
2.4.4. ACP Functional Area Facilities 10
2.4.5. Stand-Off Distance 10
2.4.6. Equipment 11
2.4.7. Visitor Control Center (VCC) 11
2.4.8. Guard Facilities 12
2.4.9. Facility Description 16
2.4.10. Accommodations 16
2.4.11. Building Areas 17
2.4.12. Hours of Operation 17
2.4.13. Ballistic Requirements 17
2.4.14. Mandatory Requirements 17
2.4.15. Facility Goals 17
2.4.16. Adapt Build Model 17
2.4.17. Outside Continental United States (OCONUS) 18

2.5. FUNCTIONAL AND OPERATIONAL REQUIREMENTS: 18

2.5.1. General 18
2.5.2. Entry Gate 18
2.5.3. Passive Vehicle Barriers 19
2.5.4. Active Vehicle Barriers (AVB) 22
2.5.5. ID Check Area 25
2.5.6. Search Area 26
2.5.7. Command and Control 28
2.5.8. Overwatch 29
2.5.9. Primary Spaces (Functional Areas) 31
2.5.10. Combinations/Square Foot Limitations for Various Functional Areas 34

2.6. SITE FUNCTIONAL REQUIREMENTS 35

2.6.1. General 35
2.6.2. Parking 36
2.6.3. Access Roadways, Drives and Islands 36

2.7. SITE AND LANDSCAPE REQUIREMENTS 36

2.7.1. Site Structures 36
2.7.2. Landscaping/Hardscaping 37
2.7.3. Site Design Requirements 38
2.7.4. Minimum Anti-terrorism Standards for ACP Buildings 40

2.8. ARCHITECTURAL REQUIREMENTS: 41

2.8.1. General Requirements 41
2.8.2. Examples of Combinations of Facilities 47
2.8.3. Architectural Specialties 48

2.9. INTERIOR DESIGN REQUIREMENTS: 48

2.9.1. General Requirements 48
2.9.2. Interior Finishes 55
2.9.3. Interior Specialties 57
2.9.4. FF&E (Furniture Fixtures & Equipment) 57

2.10. STRUCTURAL REQUIREMENTS: 59

2.10.1. General 59
2.10.2. Loadings 59
2.10.3. Seismic Design 59
2.10.4. Ballistic Resistant Design 59
2.10.5. Antiterrorism Design 59
2.10.6. Canopies 59

2.11. THERMAL PERFORMANCE 60

2.12. PLUMBING REQUIREMENTS: 60

2.12.1. Sanitary Sewer (where connection is possible) 60
2.12.2. Sanitary Sewer (where connections are not possible) 61
2.12.3. Drinking Water 61
2.12.4. Sizing 61

2.13. COMMUNICATIONS AND SECURITY SYSTEMS: 62

2.13.1. Communication 62
2.13.2. Information Connectivity 62
2.13.3. Closed Circuit Television (CCTV) 62
2.13.4. Electronic Security 63

2.13.5. AUTOMATION 64
2.13.6. ACTIVE VEHICLE BARRIER CONTROL SYSTEM 65
2.13.7. CABLE TELEVISION (CATV) 67
2.13.8. GENERAL REQUIREMENTS 67
2.14. ELECTRICAL REQUIREMENTS: 68
2.14.1. EXTERIOR LIGHTING 68
2.14.2. INTERIOR LIGHTING 70
2.14.3. GENERAL POWER REQUIREMENTS 70
2.14.4. BACK-UP POWER 71
2.14.5. LIGHTNING PROTECTION SYSTEM 73
2.15. HEATING VENTILATING AND AIR CONDITIONING (HVAC) REQUIREMENTS: 73
2.15.1. SIZING 73
2.15.2. BALLISTIC RESISTANT RATED STRUCTURES 74
2.15.3. NON-BALLISTIC RESISTANT RATED STRUCTURES 74
2.16. ENERGY CONSERVATION REQUIREMENTS 75
2.16.1. WHOLE BUILDING APPROACH 75
2.16.2. ENERGY CALCULATION METHODOLOGIES AND SUBSTANTIATION REQUIREMENTS: 76
2.16.3. DESIGN AFTER AWARD 76
2.17. FIRE PROTECTION REQUIREMENTS: 76
2.17.1. BUILDING FUNCTION REQUIREMENTS 76
2.17.2. FIRE ALARM SYSTEM 76
2.17.3. MASS NOTIFICATION 76
2.18. SUSTAINABLE DESIGN 77
2.18.1. GENERAL 77
2.18.2. LEED AND THIRD-PARTY VALIDATION 78
2.19. CYBERSECURITY FOR FACILITY RELATED CONTROL SYSTEMS (FRCS): 81
2.20. FACILITY SPECIFIC REFERENCES 82
2.21. ACP WAIVERS 83

APPENDICES

A COST INFORMATION
B DRAWINGS
C THREAT PATH CALCULATIONS EXAMPLE
D DESIGN GUIDANCE INSTRUCTIONS
E ACTIVE AND PASSIVE VEHICLE BARRIER IMPACT RATING DETERMINATION

ARMY ACCESS CONTROL POINTS STANDARD DESIGN

1. INTRODUCTION

1.1. STANDARD DESIGN

This Standard Design supersedes all previous versions for this facility type. It shall be used for construction of all new Access Control Point (ACP) projects and renovations to existing ACP projects. It is intended for use anywhere in the continental United States (CONUS) or overseas locations (OCONUS). The design procedures and drawings included in this Standard Design provide flexibility to Army ACP designers in meeting the Army's baseline physical security requirements and the full range of Force Protection Conditions on Army Installations. This Standard Design meets the Army Standard (AS) for Access Control Points (ACPs) approved by the Army Facilities Standardization Committee dated 13 April 2012. It also meets Architectural and Engineering design criteria established by the Headquarters U.S. Army Corps of Engineers (HQUSACE). The Omaha Center of Standardization (COS) must approve all changes, deviations, or waivers to the Standard Design. In addition to these requirements, Appendix D contains design guidance and instructions that are considered information only and are meant to further provide information on issues that often arise when designing an ACP.

1.2. ACP DEFINITION

An ACP is a corridor at an Installation cantonment perimeter through which all vehicles and/or pedestrians must pass when entering or exiting the Installation cantonment area. An ACP provides the first physical security boundary layer that restricts access to Department of Army (DA) Installation cantonment areas. ACP guards control the active barriers to deny or permit entry on to the Installation.

1.3. ACP CLASSIFICATIONS

DA ACP classifications are: (a) Primary, (b) Secondary, (c) Limited Use, and (d) Pedestrian. Primary and Secondary ACPs can accommodate privately owned vehicles (POVs), commercial vehicles (trucks), pedestrians, bicycles, or any combination thereof. Primary and Secondary ACPs provide the means to defeat a vehicular and/or pedestrian threat via permanent measures defined in the Army Standard for ACPs. Limited Use ACPs provide means to defeat vehicular and/or pedestrian threats via temporary or permanent measures. Limited Use ACPs do not have routine hours of operation. A Pedestrian ACP may be part of an ACP that accommodates vehicles, or it may stand alone.

For definitions of Installation, Primary ACP, Secondary ACP, Limited Use ACP, Approach Zone, Access Control Zone, Response Zone, and other definitions, see the Army Standard for Access Control Points. Remotely manned egress only ACPs are Primary or Secondary ACPs which allow only vehicular egress. Remotely manned egress only vehicular ACPs will meet the intent of all Army Standard requirements pertaining to Primary and/or Secondary vehicular ACPs. These ACPs will be remotely manned at all times when vehicle transit is allowed. When remote manning position is not occupied the AVB(s) will be locked in the deployed position. The Remotely Manned Egress Only Vehicle ACP related information in this document relates only to ACPs where this is the only mode of operation. ACPs which include Remotely Manned Egress Only Vehicle operations and other modes of operation will meet requirements for all modes of operation.

1.4. ACP FUNCTIONS

1.4.1. Site Functions

ACP site functions include, but are not limited to, Approach Zone, Access Control Zone, Response Zone, Passive Vehicle Barriers, Active Vehicle Barriers, Command and Control, ID Check Area, Overwatch, Canopies, Turn Arounds, Search Areas, Lighting, and CCTV.

1.4.2. Building Functional Areas

Some of the building function components of an ACP are Visitor Control Center (VCC), Guard Booths (ID Check and Pedestrian ID Check), Search Area Building, Command and Control, Mechanical/Electrical, Communications, Gatehouse, Toilet, Storage, and Overwatch. This standard design includes some of the function combinations that are deemed acceptable. Combinations of functional areas not included as Standard Designs may be possible but will require COS review and approval, with Standard Design exception. The only functions that cannot be combined with other functions are the Vehicle ID Check and Vehicle ID Check Guard Booths.

1.5. MANDATORY CRITERIA

See Army Standard for Access Control Points for mandatory criteria for Primary and Secondary ACPs, Limited Use ACPs, and Pedestrian ID Check.

1.6. COORDINATING FACILITY TYPES

Access Control Points may be included as a feature on a larger project site, , but typically ACPs are stand-alone projects.

1.7. STANDARD DESIGN DRAWINGS AND INFORMATION

Copies of the drawings and text information that constitutes a Standard Design are available from the supporting Center of Standardization (Omaha) U. S. Army Corps of Engineers District, and numerous military web sites. The primary web site (the address is subject to change) to consult is:

"http://mrsi.usace.army.mil/sites/cos/SitePages/Home.aspx".

1.8. OUTSIDE CONTINENTAL UNITED STATES (OCONUS)

The requirements for this document have been written around U.S. Standards. For OCONUS applications the following requirements are applicable:

Metric units of measurement are allowed.

Local codes are permitted (except where specifically noted within this document), but) but shall not be less than U.S. requirements.

Where there are no local codes, U.S. requirements shall govern.

Requirements of the Department of Army Standard Design for Access Control Points shall be used.

All construction outside of the United States is also governed by Status of Forces Agreements (SOFA), Host Nation Funded Construction Agreements (NNFA), and in some instances, bilateral Infrastructure Agreements (BIA). Therefore, the acquisition team must ensure compliance with the most stringent of any UFC applicable, the SOFA, the HNFA, and the BIA, as applicable.

Exceptions to the above requirements include line-of-sight, ballistic ratings, threat calculations, anti-terrorism standards and standoff distances included in this document.

1.9. RFP WIZARD

The RFP Wizard is an Army Transformation Model for Design-Build Requests for Proposals (RFP). Paragraph 2 in this document includes references to the RFP Wizard, which require informed decisions to be made in order to assemble the RFP correctly. Consult the Omaha District COS for decisions on language if selected options cannot be made confidently.

2. SCOPE OF WORK

2.1. ACCESS CONTROL POINTS

Provide an installation access control point(s) which will allow safe, convenient vehicular and pedestrian access to the installation, while ensuring anti-terrorism/ force protection (AT/FP) measures are implemented.

The project is based on, and shall comply with, the Army Standard for Access Control Points (ACP-AS) and the Department of Army Access Control Points Standard Design (ACP-SD). The Access Control Point (ACP) functions are a corridor through which all vehicles and pedestrians pass when entering or exiting an installation. The ACP personnel perform identification verification procedures and control the active barriers that deny or permit entry on to the installation.

In addition, the ACP(s) shall be provided with a Closed-Circuit Television (CCTV) camera system, security lighting, duress system, Intrusion Detection System (IDS), communications system, LAN, back-up power system, traffic control system, overspeed detection system (if necessary), wrong way detection system, active vehicle barriers and control system and passive vehicle barriers. CCTV system shall include cameras, digital video recorders (DVR), monitors and controls. Cameras shall be provided at the Visitor Control Center (when required), overwatch area, ID check area, vehicle inspection areas, and active vehicle barrier (AVB) areas. Camera monitoring shall occur at the Command and Control and at a central monitoring station when present. Lighting shall be provided at the Approach zone, Access Control Zone, Response zone, vehicle search (inspection) areas, active barrier areas and parking areas. A back-up power system shall be provided with a generator and uninterruptible power supply (UPS).

The ACP(s) in this document may be a mixture of Design Build requirements with partial design drawings or Full Construction Plans and Specifications. [RFP Wizard: See Part 3 and Appendices for additional details for Design Build Request for Proposal (RFP).]

Construct the ACP(s) to include the facilities and features listed below.

2.2. TRAFFIC AND TRANSPORTATION ENGINEERING

2.2.1. Traffic Engineering Study (TES)

A. The ACP shall be planned, designed, and so located as not to create un-safe off-Installation traffic queuing or any other un-safe traffic practices as defined by Surface Deployment and Distribution Command Transportation Engineering Agency (SDDCTEA) and all other applicable roadway standards/criteria.

B. The traffic engineering study shall be either conducted or approved by the Military Surface Deployment and Distribution Command Transportation Engineering Agency (SDDCTEA).

   i. In some instances (e.g. very low volume ACPs) SDDCTEA may accept, at their discretion, abbreviated traffic engineering studies. The contents required for programming/design of key ACP design features may be determined by SDDCTEA on a case-by-case basis.

C. The traffic engineering study shall be based on the largest anticipated design demand value that occurs between the current traffic volume and the projected traffic volume five (5) years in the future.

D. The traffic engineering study shall not project future demand through use of standardized population growth rates for the Installation itself unless supported by Installation specific data.

The traffic engineering study may utilize standardized population growth rates for surrounding communities.

2.2.2. Transportation Engineering

A. The ACP shall be capable of handling the largest expected vehicle that will be processed. However, if the ACP processes trucks, it shall be capable of turning around the largest truck common to state or host nation roadways, and capable of processing the largest truck that is allowed onto the installation.

B. Analyses related to determination of the required number of ID check area lanes may include queuing but shall not include queuing that results in off-Installation traffic impacts.

C. Calculate existing and future lane requirements per Pamphlet 55-15, Traffic and Safety Engineering for Better Entry Control Facilities or similar method with consideration of growth, as well as single or tandem lane processing and Automated Installation Entry (AIE), etc.).

D. The efficient use of guard manpower will be considered when calculating the number of ID check area lanes.

E. In locations where pedestal mounted AIE is anticipated calculations related to ID check area lane, quantities shall not anticipate throughput rates in excess of 375 vehicles/hour/lane. Locations using other forms of automation shall utilize validated processing rates for that specific form of automation.

F. The calculations for the number of ID check lanes shall not be based on the use of more than 2 guards per lane.

G. Utilize the ACP/ ECF SMART Decision Evaluator© (or other methods to accomplish the same results) to evaluate the existing, short-term and long-term impact of security, manpower, automation, and roads and traffic.

H. Identify traffic control requirements per SDDCTEA Pamphlet 55-15, Traffic and Safety Engineering for Better Entry Control Facilities.

2.2.3. Turning Movements

A. Turning movement calculations/modeling shall be performed to confirm that the correct vehicle turning radius is achieved and to demonstrate there is no conflict with other vehicles in the ACP corridor. Turning movement analysis shall address all traffic types to be processed. Turning movements shall address, at a minimum, both POVs and trucks, if applicable. If trucks are prohibited at the ACP, truck modeling may terminate at the post ID Check rejection point. The turning movement calculations/models shall be provided for all turning movements.

B. The turning movement analysis shall be performed for all anticipated vehicle paths.

C. The turning movement analysis shall include, but may not be limited to, : horizontal road alignment, turn-around and rejection, entrance and egress paths for the ACP corridor, search areas and visitor control centers (when present).

2.3. DEFEAT OF VEHICLE THREAT SCENARIOS

2.3.1. Office of Provost Marshal General (OPMG) Vehicle Threat Scenarios

ACPs shall be designed to defeat the following four minimum vehicle threat scenarios. Additional vehicle threat scenarios shall be included if required by a local threat assessment. Appendix C covers the methodology associated with performing the threat path calculations by providing an example. Remotely

manned egress only vehicle ACPs shall include a vehicle resistant corridor of sufficient length to preclude wrong way circumvention of the AVB by a potential inbound threat vehicle. Corridor length shall be based on an engineering threat delay analysis which considers vehicle egress time, inbound threat time, and time required for the AVB to return to the deployed position.

A. Vehicle Threat Scenario #1. Threat vehicle enters the ACP in the inbound or outbound lane(s) at the maximum speed attainable at the ACP entrance and then immediately accelerates at its maximum acceleration rate through the ACP.

    i. Threat vehicle characteristics shall be as defined below (includes, but is not limited to,: top speed, acceleration, etc.)

B. Vehicle Threat Scenario #2. Threat vehicle enters the ACP in the inbound or outbound lane(s) at or under the posted ACP Speed Limit and then, later at some point further in the Approach Zone, accelerates at its maximum acceleration rate through the remainder of the ACP.

    i. Note that 'some point' shall be interpreted as being the worst-case threat delay time from point of detection to Active Vehicle Barrier (AVB) location(s) in the response zone. If multiple zones of overspeed detection are utilized the analysis will include the worst-case situations for each overspeed zone.

C. Vehicle Threat Scenario #3. Threat vehicle feigns compliance and stops in lane. The guard detects threat behavior or criminal status through observation or electronic means and moves to guard booth to initiate denial process. Threat vehicle occupant(s) attempt to force entry (tactics include potential use of direct fire weapons and acceleration through the ACP).

    i. Baseline protection for direct fire weapon shall be UL 752-Level 3. A higher level is required if direct fire weapons are identified in local threat assessment/policy that exceed the capabilities of UL 752-Level 3. The contents of local threat assessment/policy are not sufficient justification for the lowering of the baseline ballistic resistance (UL 752-Level 3). Use of ballistic standards other than UL 752 may be utilized anywhere where the barrier rating can be verified as clearly meeting or exceeding UL requirement designated.

D. Vehicle Threat Scenario #4. Similar to Threat Scenario 3 above, except the driver of the denied vehicle drives toward the Turn-around or Search Area at the ACP Speed Limit as if complying with guard instructions, but then fails to turn and instead accelerates at its maximum acceleration rate through the ACP while attempting to enter the Installation cantonment area.

2.3.2. Threat Vehicle Characteristics

A. Acceleration Rate. Threat calculations shall utilize the acceleration rate of 11.3 feet per second squared (feet/second/second) when determining delay.

    i. Where applicable the lower acceleration rates associated with trucks/commercial vehicles can be utilized for calculating the required stopping capability of passive and active vehicle barrier systems; however, lower acceleration rates are not relevant to delay calculations.

B. Deceleration Rate. Threat calculations shall utilize a deceleration rate of 24.1 feet per second squared (feet/second/second) when calculating delay.

C. Friction Factors. Threat calculations shall utilize a friction factor of 1.0. Calculations performed for threat purposes differ significantly from calculations typically performed for consideration of driver comfort. Lower friction factors associated with highway safety shall not be used for threat calculations.

D. Maximum Velocity. The maximum velocity of the 4,630 pounds baseline threat vehicle utilized for delay calculations shall be 130 mph. This parameter shall be utilized for calculation of delay unless a 'local' threat assessment and/or policy identifies a vehicle that is capable of a greater velocity. The addition of larger vehicles or trucks through mandatory incorporation of threats identified in 'local' threat assessments and/or policies shall not be considered justification for use of a reduced velocity in delay calculations.

   i. The maximum velocity of specific threat vehicles (where local threat analysis and/or policy identifies a specific vehicle) shall be obtained from manufacturer specifications.

   ii. The maximum velocity of other vehicle classes (where a type of vehicle e.g. 'pickup truck' is identified in local threat analysis and/or policy) shall be calculated through acquisition of information on at least 5 vehicles within the type and averaging the top speed of the lot. If significant outliers (atypical vehicles with unusual characteristics) exist, they may be removed from the sample set.

E. Vehicle Mass. The baseline threat vehicle shall be a large passenger car as defined in ASTM F2656. The weight of the baseline threat vehicle is 4,630 pounds and the mass is 143.8 slugs. This mass shall be utilized for kinetic energy calculations unless a vehicle of larger mass is included due to the aforementioned incorporation of local threat analysis and/or policy.

F. Modification of baseline vehicle threat. The baseline threat vehicle must be adjusted in accordance with all applicable 'local' threat analysis and policy. All relevant 'local' threat analyses and policy shall be reviewed and incorporated. Classification of such documentation is not justification for exclusion of baseline threat vehicle for barrier impact energy and/or delay calculations. Both the baseline vehicle and the additional vehicle(s) (identified by 'local' threat assessment and/or policy) shall be analyzed and the more stringent of results shall be applied.

2.4. GENERAL REQUIREMENTS

2.4.1. ID Check Area

A. Design Demand of Vehicle per Hour (vph)
[Less than 290 vph] [Greater than 290 vph]

B. Number of ID Check Lanes
[2] [3] [4] [5] [6] [7] [8] [9] [10] lanes under the ID Check Area Canopy

C. Vehicle ID Check Area Guard Booths: One for each Vehicle ID Check Lane.

2.4.2. Ballistic Resistance

UL 752-Level [3] [4] [5], where required.

2.4.3. Canopies

Canopies are required for the ID Check Area, (Truck) Search Area, Passenger Vehicle Search Area and Combination Truck and Passenger Vehicle Search Areas, where required.

2.4.4. ACP Functional Area Facilities

[See Center of Standardization (COS) drawings required for the ACP project] [RFP Wizard: included in Appendix B – Drawings].

2.4.5. Stand-Off Distance

As identified on site drawings furnished for the ACP Project.

2.4.6. Equipment

A. Truck Inspection Equipment to be Used: [Vehicle Inspection System] - [Mobile] [Permanent] [None]

B. Functional Area Facility/Facilities Equipment: [None] [Package Scanner] [_____]

2.4.7. Visitor Control Center (VCC)

A. VCC must be located such that visitor processing occurs prior to entry into the Installation (prior to ID Check location).

B. Paved road surface used to support movement to/from the VCC location must not provide opportunity for undetected bypass of the ID check area. Configuration shall not anticipate detection of bypass by personnel working at the visitor control center, ID check area, or search areas. These personnel are not capable of monitoring paved bypass paths for the VCC.

C. If the Installation accepts visitors and does not currently possess a VCC one should be included in the first available ACP project.

D. The VCC shall include the following:

   i. Parking.

   ii. Service Counter.

   iii. Waiting Area.

E. The VCC may include the following:

   i. Self-registering kiosks.

   ii. Administration Office.

   iii. Break Room.

   iv. Electric Water cooler.

   v. Toilet.

F. Ballistic protection of guard positions

   i. When guard functions requiring ballistic protection (e.g. command & control, pedestrian ID check, etc.) are combined in a facility with the VCC function the guards must be separated from VCC personnel (both workers and visitors waiting to be processed) by ballistic rated building components (walls, glazing, doors, etc.).

   ii. Where guards are utilized solely to perform VCC function(s) it is not necessary to provide a ballistic rated separation between the guard and the visitor. Non-ballistic rated guard positions cannot be designed to require shared VCC responsibility with guards responsible for command & control, ID check area, overwatch building, active vehicle barrier deployment or similar functions.

   iii. Visitor control center worker positions (non-guard) are not required to include ballistic protection.

G. Occupancy Level. The occupancy level of the VCC shall be the sum of the number of visitors waiting to be processed, the number of visitors being processed, the number of processors, and the number of supervisors and security personnel in the VCC anytime during the peak hour.

Equation: Occupancy = VW+VP+c+S

Where:

VW = Visitors waiting to be processed

VP = Visitors currently being processed

c = number of processors

S = Supervisors/Security personnel in VCC

i. The number of Visitors waiting to be processed can found by taking the 1-hour processing rate time (60 minutes) and dividing it by the processing rate and subtracting one (for the Visitor currently being processed) and then multiplying the resulting number by the total number of processors. If the Visitors waiting to be processed is determined to be a negative number than the VCC is processing all Visitors as they come into the VCC and the number of Visitors waiting is zero.

Equation: VW = V - [(60 min / p)-1] x c

Where:

V = Peak Hourly Visitor Rate

p = Processing rate (minutes/visitor)

ii. The number of Visitors currently being processed will be the lower of either the number of Processors in the VCC or the number of Visitors that come into the VCC for each processing rate cycle. The number of Visitors per processing rate cycle can be determined by dividing the Peak Hourly Visitor Rate by 60 minutes in an hour and multiplying it by the Processing Equation:

Equation: $VP_{RC} = (V/60) \times p$

Where:

VP_{RC} = Visitors being process per processing rate cycle

2.4.8. Guard Facilities

A. Vehicle ID Check Area Guard Booths (Used by guards responsible for validating credentials of vehicle occupants)

i. Provide a minimum of one guard booth for each vehicle ID check area entry lane.

ii. Raised traffic island - The guard booth will be protected by a raised traffic island in one of the following ways:

a. Locate the guard booth on a raised traffic island. Provide a minimum of 3’ setback between doorways of guard booth and face of raised traffic island curb. Must also include, as a minimum, a 1’ horizontal clearance between face of traffic island curb and guard booth roof, gutters or any other objects protruding from the guard booth

b. Recess the guard booth within a raised traffic island. Curb may be interrupted to allow movement of guard between booth and ID check position (adjacent to vehicles) to occur without stepping onto, off or over raised island or curb sections.

iii. Passive Barrier Protection

a. Provide protection against errant impact.

b. The protection provided for the guard booth structure is not required to be an ASTM, Department of State (DOS) or DOD anti-ram capable product.

c. Protection (passive barrier) may be located on the leading edge of the island on which the guard booth is located and shall be prior to the leading canopy column (if present).

d. If breaks in the ID check traffic island curb-line exist, additional protection should be included to mitigate errant impact.

iv. Dimensions

a. Minimum nominal ID check area guard booth width shall be 4 feet.

b. Minimum nominal ID check area guard booth length shall be 10 feet.

v. Prohibition of Combining with Other Functions - The function performed by the ID Check Area Guard Booths used for validating credentials of vehicle occupants shall not be combined with any other function.

vi. Field of View - Shall provide a 360-degree field of view for occupant. Door frame interruptions in lines of sight shall not exceed 11 degrees for a guard sitting or standing at the counter. Door frame interruption of guard line of sight shall be minimized.

vii. Ballistic Rating - Shall, as a minimum, be ballistic rating of UL 752 – Level 3 with a higher level being required if prescribed in 'local' threat analyses or policy.

viii. Blast Resistance - Given the proximity of the guard booth to vehicular traffic it is normally not considered feasible to provide blast protection for ID check guard booth occupants.

ix. HVAC

a. General Requirements – General requirements pertaining to HVAC can be found in paragraph 3.11 Heating, Ventilating, and Air-Conditioning (HVAC) Requirements of this document.

b. Ballistic Rating - All penetrations of guard booth resulting from incorporation of HVAC shall provide the same level of ballistic resistance as the rest of the guard booth. The roof and floor of the guard booth (to include HVAC penetrations) shall not require ballistic protection unless direct fire trajectory is possible through roof/floor and into the occupied portion of the guard booth.

c. Exterior HVAC units should be placed so that they do not provide a convenient sitting or resting position for guard staff. Where this is not possible, provide seating surface above HVAC unit to prevent personnel from sitting directly on the HVAC unit.

x. Energy Policy - Shall adhere to the latest national energy policy unless applicable exemption exists within said policy and can be found in paragraph 2.18. Sustainable Design.

xi. Counter - Must include a counter oriented such that a guard is facing inbound (ingress) traffic while seated or standing at the counter.

xii. Door(s) - Must include door(s) oriented in the direction of each lane for which a guard occupying the booth has vetting responsibility (includes situations where vehicle occupants' identification is validated remotely through use of automated equipment).

xiii. Provide exterior power outlet sufficient to power hand-held searchlights, and bug zappers etc.

xiv. Provide interior power outlet sufficient for radio chargers, and computers, etc.

xv. Provide active vehicle barrier control console with annunciator, computer workstation, and communications equipment including Local Area Network (LAN), telephone, and Internet connections.

xvi. Communications. Provide a minimum of two (2) means of communications from the facility and with the Central Security Monitoring Station.

xvii. Electronic Security.

a. Duress Alarms. Provide duress alarm capability that annunciates at both the Command and Control and the Central Security Monitoring Station.

b. Intrusion Detection. The entry doors to the ID Check Area Guard Booths are to be equipped with Balanced Magnetic Switches (BMS) for intrusion detection.

c. CCTV. Provide the means to control the cameras from Command and Control. It is recommended that CCTV monitors be placed above the counter, if there is wall space.

xviii. Active Vehicle Barrier Controls.

a. Provide emergency-fast-operate (EFO) controls for all active vehicle barriers related to the ACP. One EFO will be located on the counter, and another will be located in close proximity to the guard position while performing vehicle ID Check validation.

b. Panel is to have LED indicator lights showing whether or not the panel is functional and capable of barrier deployment.

xix. Remotely Manned Egress Only Vehicle Access Control Points.

a. Do not require guard facilities at the ACP location.

b. Require a remote guard position which is manned at all times vehicles are allowed to utilize the ACP. Barrier will be locked in the deployed position during times that the ACP is not being actively monitored.

B. Pedestrian ID Check Guard Booth functional area (Used by guards responsible for validating credentials of pedestrians)

i. Raised traffic island - The Pedestrian ID Check will be protected by a raised traffic island in one of the following ways:

a. If located within the roadway clear zone, locate the guard booth on a raised traffic island. Provide a minimum of 3 feet setback between doorways of guard booth and face of raised traffic island curb.

b. If located within the roadway clear zone, the functional area must include, as a minimum, a 1 feet horizontal clearance between the face of traffic island curb and guard booth roof, gutters or any other objects protruding from the guard booth.

ii. Passive Barrier Protection

a. Must be provided with protection against errant impact if located on a traffic island or within the roadway clear zone.

b. Protection (passive barrier) may be located on the leading edge of the island on which the guard booth is located.

iii. Dimensions: Minimum width of 4 feet and minimum length of 10 feet, but in no case shall the building exceed the maximum square footage specified in the Army Standard (AS).

iv. Prohibition of Combining with Other Functions - This function differs from the vehicle ID check guard booth. The pedestrian ID check guard booth function may be combined with other functions.

v. Field of View - Shall provide a 180-degree field of view for guard. Interruptions in lines of sight shall not exceed 11 degrees for a guard sitting or standing at the counter.

vi. Ballistic Rating - As a minimum, shall have a ballistic rating of UL 752 – Level 3 with a higher level being required if prescribed in 'local' threat analyses or policy.

vii. HVAC

a. Required - General Requirements – General requirements pertaining to HVAC can be found in paragraph 3.11 Heating, Ventilating, and Air-Conditioning (HVAC) Requirements of this document.

b. Ballistic Rating

All penetrations of guard booth resulting from incorporation of HVAC shall provide the same level of ballistic resistance as the rest of the guard booth. The roof and floor of the guard booth (to include HVAC penetrations) shall not require ballistic protection unless direct fire trajectory is possible through roof/floor and into the occupied portion of the guard booth.

The guard position shall be separated from pedestrian traffic by ballistic rated materials whether the ballistic rated material is exterior to a facility or interior to a facility.

viii. Material transfer - A 'deal tray' or other device offering a similar level of protection shall be included for transfer of materials (e.g. identification, and/or passes, etc.) between pedestrians and guard personnel. Where pedestrians are outside and materials are transitioning between indoor and outdoor, the deal tray shall be intended for use in the local climate and rated for exterior use.

ix. Energy Policy - Shall adhere to the latest national energy policy unless applicable exemption exists within said policy and can be found in paragraph 2.18. Sustainable Design.

x. Counter - Must include a counter oriented such that a guard is facing pedestrian traffic while seated or standing at the counter.

xi. Provide exterior power outlet sufficient to power hand-held searchlights.

xii. Provide interior power outlet sufficient for radio chargers, and computers, etc.

xiii. Provide active vehicle barrier control console with annunciator, computer workstation, and communications equipment including Local Area Network (LAN), telephone, and Internet connections.

xiv. Communications. Provide a minimum of two (2) means of communications from the facility and with the Central Security Monitoring Station.

xv. Electronic Security.

a. Duress Alarms. Provide duress alarm capability that will annunciate at both the Command and Control and the Central Security Monitoring Station.

b. Intrusion Detection. The entry door(s) is to be equipped with Balanced Magnetic Switches (BMS) for intrusion detection.

xvi. Communication and Security Systems – General Requirements. See paragraph 3.9 Communications and Security Systems.

xvii. Active Vehicle Barrier Controls.

a. Provide emergency-fast-operate (EFO) controls for all active vehicle barriers related to the ACP.

b. Panel is to have LED indicator lights showing whether or not the panel is functional and capable of barrier deployment.

2.4.9. Facility Description

A. The Access Control Point (ACP) must comply with the Department of Army (DA) standards for this facility type. The ACP(s) are required by the DA to provide safe entry to the installation by authorized procedures for vehicles, and/or pedestrian traffic. Both safety and security requirements are primary of the ACP criteria.

B. Facility types may be adapt build (based on approximately 80% level of design), design build (based on specific floor plan) or design/build (based on functional requirements only).

2.4.10. Accommodations

A. Accessibility Requirements

The Visitor Control Center(s), Search Area Building(s) and Pedestrian ID Check (Where those being vetted are inside the facility) are the only ACP facilities that require access by individuals with disabilities. Provide access for individuals with disabilities in accordance with Architectural Barriers Act (ABA) and Americans with Disabilities Act (ADA) Accessibility Guidelines or Host Nation equivalent.

B. Nursing Mother’s Room

Provide Nursing Mothers accommodations in accordance with UFC 1-200-01 DOD Building Code.

Complete ACP renovations or new ACP campus projects shall include nursing accommodations in one of the larger buildings on the ACP campus. A large building will be defined as having equal to or greater than 400 square feet of occupiable space. Renovation projects of existing large buildings shall include nursing accommodations.

New or existing ACP campuses, which include only small buildings, shall provide accommodations for nursing mothers through operational procedures identified and coordinated with the security forces, either on-site, at an adjoining facility, or at a security forces facility. A small building will be defined as having less than 400 square feet of occupiable space, so a Gatehouse, Guard Booth, and Overwatch are all examples of small buildings. When programming renovations or new facilities it will be necessary to account for additional square footage and cost into the programming documents.

2.4.11. Building Areas

GROSS AREA: For each ACP building or structure, provide gross building area as calculated by UFC 3-101-01, "01, "Architecture", Chapter 2 which is the area included within the surrounding exterior walls measured from outside face of wall to inside face of wall.

2.4.12. Hours of Operation

The hours of operation for access control points will depend upon ACP classification. For primary ACPs the hours of operation are typically 24 hours a day, 7 days a week. For secondary ACPs the hours of operation will vary with installation requirements and are generally less than 24 hours a day, 7 days a week. Limited use ACPs are open only for special events, and do not have a fixed schedule.

2.4.13. Ballistic Requirements

Various buildings defined (guard booths, command and control function, and overwatch position, etc.) require design/ construction for ballistic resistance to UL 752-Level 3 or higher. See paragraph 2 SCOPE OF WORK for required ballistic level.

2.4.14. Mandatory Requirements

Floor plans included are considered conceptual, but strongly encouraged to fit mandatory functions into each building. For OCONUS locations dimensions shown shall be considered nominal. Changes are allowed where required for use of metric construction materials.

2.4.15. Facility Goals

A. The objective of the access control facilities is to prevent unauthorized vehicles and where required pedestrians from entering an installation. The access control point needs to be constructed with features that support the effective use of equipment, procedures, and manpower.

B. The technical and functional requirements defined herein are the standard requirements that apply to all (DA) ACP projects and are current with Headquarters U.S. Army Corps of Engineers (HQUSACE) criteria.

C. The ACP is intended to provide a high level of safety while meeting the ACP Standard requirements.

2.4.16. Adapt Build Model

When an Adapt-Build Model is available to use as a basis for design and/or construction, it will be posted on the Center of Standardization (CoS) web site, noted in solicitation documentation, or made available upon request as follows:

CoS Web Site address:

https://mrsi.erdc.dren.mil/cos/nwo/acp/

CoS address:

U. S. Army Corps of Engineers, Omaha District
CENWO-ED-D
1616 Capitol Avenue
Omaha, NE 68102-4901

Attn: CoS Program Manager (Matthew Hebert)

2.4.17. Outside Continental United States (OCONUS)

The requirements for this document have been written primarily around U.S. Standards. For OCONUS applications the following requirements are applicable:

A. Metric units are allowed.

B. Local codes are permitted (except where specifically noted within this document), but) but shall not be less than U.S. requirements.

C. Where there are no local codes, U.S. requirements shall govern.

D. Requirements of the Department of Army Access Control Points Standard Design (ACP-SD).

E. All construction outside of the United States is also governed by Status of Forces Agreements (SOFA), Host Nation Funded Construction Agreements (NNFA), and in some instances, bilateral Infrastructure Agreements (BIA). Ensure compliance with the most stringent of any UFC applicable, the SOFA, the HNFA, and the BIA, as applicable.

F. Exceptions to the above requirements include line of sight, ballistic ratings, threat path calculations, anti-terrorism standards and standoff distances included in this document.

2.5. FUNCTIONAL AND OPERATIONAL REQUIREMENTS:

2.5.1. General

A. Functional areas and facilities included in the design of ACP(s) are as listed below.

B. Coordinate the visual appearance and exterior material selections as well with the standards set by the Installation in their respective Installation Design Guide. Address the impact of climate, security and geography appropriately. There may be reasons to control exterior traffic noise from entering the facilities and may require special treatment or Standard Transmission Class (STC) rating on major building components. Provide appropriate and adequate protection from the wind, and wind driven precipitation for doors and entries.

2.5.2. Entry Gate

Entry gate will have the same level of protection as the adjacent perimeter.

A. Signage

i. Type: Entry gate signage shall be as indicated in Section 7.5 of SDDCTEA Pamphlet 55-15 for CONUS locations (to include both Hawaii and Alaska). OCONUS entry gate signage shall conform to host nation criteria for closure/barricading of a normally open roadway lane. In the absence of applicable host nation criteria, the entry gate shall be signed in accordance with the aforementioned criteria.

ii. Retro reflectivity: Entry gate signage shall be red/white retroreflective or illuminated to show the same shape and similar color by both day and night. Retro reflectivity and/or illumination shall be in accordance with the Manual on Uniform Traffic Control Devices

(MUTCD) for CONUS locations (to include both Hawaii and Alaska). OCONUS entry gate signage shall include retro reflectivity and/or illumination in accordance with host nation criteria where such exists. If no host nation criteria exist for retro reflectivity/illumination of barricade signage, then the MUTCD criteria shall be utilized.

B. Impact Resistance

i. Where adjacent perimeter is not vehicle resistant, the fence gate is not required to exceed the kinetic energy mitigation/defeat capabilities of the adjacent perimeter fence.

ii. Where adjacent perimeter is vehicle resistant and vehicle resistant capability of adjacent perimeter is manmade, the fence gate shall match or exceed the kinetic energy rating of the adjacent perimeter fence/wall/barrier. Where the adjacent perimeter anti-ram capabilities are provided by topographic feature, the fence gate shall match or exceed the kinetic energy mitigation/defeat capabilities of the adjacent perimeter. In this case, however, the fence gate is not required to exceed 1,250,000 ft-lbs. of kinetic energy resistance (limit of requirement is K12 equivalent).

C. Remotely Manned Egress Only Vehicle ACPs

i. Shall include an automatic fence gate which is programmed to open when AVB sensors detect egress traffic and will be programmed to close automatically when no vehicles have been detected by the AVB system for a period of 30 seconds. Fencing will connect the fence gate to other fencing or features to preclude circumvention by pedestrians.

2.5.3. Passive Vehicle Barriers

A. Approach Zone

Passive vehicle barriers in the approach zone will begin at the entry gate/perimeter and extend to the access control zone passive vehicle barriers. Transitions between passive vehicle barrier systems shall not represent weak points in the barrier system.

i. Passive Vehicle Barriers will be designed to defeat the kinetic energy associated with the baseline threat and any additional threat identified in ‘local’ threat analyses or policy.

a. Achievable angle and velocity shall be included in such calculations.

b. Kinetic energy calculations must be performed for the baseline threat vehicle as well as any additional vehicles included through mandatory incorporation of ‘local’ threat analyses.

ii. Passive vehicle barriers must be certified or approved in accordance with one of the following:

a. Included on the list of DOD Anti-Ram Vehicle Barriers maintained by the U.S. Army Corps of Engineers (USACE)-Protective Design Mandatory Center of Expertise (PD-MCX),

b. Analysis is not currently an acceptable method of validation.

iii. Capacity (kinetic energy defeat/mitigation capability)

The kinetic energy mitigation capacity of the system shall be capable of defeating the baseline threat vehicle and any additional threat vehicles identified in ‘local’ threat assessment and/or policy.

However, the capacity of the passive vehicle barrier system is not required to exceed 1.25 million ft-lbs of kinetic energy defeat capability unless 'local' threat assessment and/or criteria identifies a threat vehicle in excess of 15,000 pounds and that threat vehicle is capable of approaching the passive vehicle barrier system at a speed and angle resulting in impact energy in excess of the previously mentioned 1.25 million ft-lbs.

The ACP passive vehicle barrier corridor shall be analyzed in segments.

a. Segments will be restricted in length to those locations where the potential impact energy of a threat vehicle on the vehicle barrier system is equal.

b. Segments will break where a change in passive barrier alignment in relation to the ACP roadway differs or the layout of the barriers and roadway differs.

c. Segments will also be broken where any other existing or proposed topography or ACP features in any other way increases or decreases the potential impact energy of a threat vehicles speed or angle of approach prior to impact with the passive vehicle barrier system.

iv. Gaps

The gaps between elements of a passive vehicle barrier system (or between systems) shall not exceed 4 feet where potential angle of impact exceeds 60 degrees and achievable speed (for impact at the 60 degrees or more angles) exceeds 40 miles per hour. The gaps between elements of a passive barrier system (or between systems) where potential velocity and angle of impact do not meet or exceed the threshold identified above shall not exceed 5 feet.

v. Transition

The transition between passive vehicle barrier systems shall not result in weak points. Transitions between barrier systems or types will include measures to ensure that the transition meets or exceeds the kinetic energy mitigation/defeat level of the adjacent barrier systems.

B. Control Zone

Passive vehicle barriers in the access control zone will begin at the termination of the approach zone passive vehicle barriers and extend to the response zone passive vehicle barriers. Transitions between passive vehicle barrier systems shall not represent weak points in the barrier system.

i. Passive Vehicle Barriers will be designed to defeat the kinetic energy associated with the baseline threat and any additional threat identified in 'local' threat analyses or policy.

a. Achievable angle and velocity shall be included in such calculations.

b. Kinetic energy calculations must be performed for the baseline threat vehicle as well as any additional vehicles included through mandatory incorporation of 'local' threat analyses.

ii. Passive vehicle barriers must be certified or approved in accordance with one of the following:

a. Included on the list of DOD Anti-Ram Vehicle Barriers maintained by the U.S. Army Corps of Engineers (USACE)-Protective Design Mandatory Center of Expertise (PD-MCX),

b. Analysis is not currently an acceptable method of validation.

iii. Capacity (kinetic energy defeat/mitigation capability)

The kinetic energy mitigation capacity of the system shall be capable of defeating the baseline threat vehicle and any additional threat vehicles identified in 'local' threat assessment and/or policy.

However, the capacity of the passive vehicle barrier system is not required to exceed 1.25 million ft-lbs of kinetic energy defeat capability unless 'local' threat assessment and/or criteria identifies a threat vehicle in excess of 15,000 pounds and that threat vehicle is capable of approaching the passive vehicle barrier system at a speed and angle resulting in impact energy in excess of the previously mentioned 1.25 million ft-lbs.

The ACP passive vehicle barrier corridor shall be analyzed in segments.

a. Segments will be restricted in length to those locations where the potential impact energy of a threat vehicle on the vehicle barrier system is less than or equal.

b. Segments will break where a change in passive barrier alignment in relation to the ACP roadway differs or the layout of the barriers and roadway differs.

c. Segments will also be broken where any other existing or proposed topography or ACP features in any other way increases or decreases the potential impact energy of a threat vehicles speed or angle of approach prior to impact with the passive vehicle barrier system.

iv. Gaps

The gaps between elements of a passive vehicle barrier system (or between systems) shall not exceed 4 feet where potential angle of impact exceeds 60 degrees and achievable speed (for impact at the 60 degrees or more angles) exceeds 40 miles per hour. The gaps between elements of a passive barrier system (or between systems) where potential velocity and angle of impact do not meet or exceed the threshold identified above shall not exceed 5 feet.

v. Transition

The transition between passive vehicle barrier systems shall not result in weak points. Transitions between barrier systems or types will include measures to ensure that the transition meets or exceeds the kinetic energy mitigation/defeat level of the adjacent barrier systems.

C. Response Zone

Passive vehicle barriers in the Response Zone will begin at the termination of the control zone passive vehicle barriers and extend to the active vehicle barriers. Transitions between passive vehicle barrier systems and active vehicle barriers shall not represent weak points in the barrier system.

i. Passive Vehicle Barriers will be designed to defeat the kinetic energy associated with the baseline threat and any additional threat identified in 'local' threat analyses or policy.

a. Achievable angle and velocity shall be included in such calculations.

b. Kinetic energy calculations must be performed for the baseline threat vehicle as well as any additional vehicles included through mandatory incorporation of 'local' threat analyses.

ii. Passive vehicle barriers must be certified or approved in accordance with one of the following:

a. Included on the list of DOD Anti-Ram Vehicle Barriers maintained by the U.S. Army Corps of Engineers (USACE)-Protective Design Mandatory Center of Expertise (PD-MCX),

b. Analysis is not an accepted method for validation.

iii. Capacity (kinetic energy defeat/mitigation capability)

The kinetic energy mitigation capacity of the system shall be capable of defeating the baseline threat vehicle and any additional threat vehicles identified in 'local' threat assessment and/or policy.

However, the capacity of the passive vehicle barrier system is not required to exceed 1.25 million ft-lbs of kinetic energy defeat capability unless 'local' threat assessment and/or criteria identifies a threat vehicle in excess of 15,000 pounds and that threat vehicle is capable of approaching the passive vehicle barrier system at a speed and angle resulting in impact energy in excess of the previously mentioned 1.25 million ft-lbs.

The ACP passive vehicle barrier corridor shall be analyzed in segments.

a. Segments will be restricted in length to those locations where the potential impact energy of a threat vehicle on the vehicle barrier system is equal.

b. Segments will break where a change in passive barrier alignment in relation to the ACP roadway differs or the layout of the barriers and roadway differs.

c. Segments will also be broken where any other existing or proposed topography or ACP features in any other way increases or decreases the potential impact energy of a threat vehicles speed or angle of approach prior to impact with the passive vehicle barrier system.

iv. Gaps

The gaps between elements of a passive vehicle barrier system (or between systems) shall not exceed 4 feet where potential angle of impact exceeds 60 degrees and achievable speed (for impact at the 60 degrees or more angles) exceeds 40 miles per hour. The gaps between elements of a passive barrier system (or between systems) where potential velocity and angle of impact do not meet or exceed the threshold identified above shall not exceed 5 feet.

v. Transition

The transition between passive vehicle barrier systems shall not result in weak points. Transitions between barrier systems or types will include measures to ensure that the transition meets or exceeds the kinetic energy mitigation/defeat level of the adjacent barrier systems.

2.5.4. Active Vehicle Barriers (AVB)

A. Safety Scheme

The Active Vehicle Barriers and Access Control Point Control System types shall conform to a safety scheme, as identified by Surface Deployment Distribution Command Transportation and Engineering Agency (SDDCTEA). All identified components of the identified SDDCTEA safety scheme will be included.

Major AVB renovation projects will include upgrades to the AVB safety regime which bring the AVB system into conformance with a current SDDCTEA safety scheme.

Remotely Manned Egress Only Vehicle ACPs shall utilize the High Efficiency Presence Detection SDDCTEA safety scheme with the Active Vehicle Barriers being operated in the 'normally deployed' mode. When no egress vehicles are detected by the AVB system the AVB will remain in the deployed position.

B. Security

The active vehicle barrier system selected must be a DOD active vehicle barrier system that has been tested in accordance with State Department STD-02.01 or ASTM F-2656 by an accredited laboratory/test facility and included on the DOD anti-ram vehicle barrier list.

The DOD anti-ram vehicle barrier list can be found on the U.S. Army Corps of Engineers, Protective Design Center website. The list is updated quarterly.

https://www.nwo.usace.army.mil/About/Centers-of-Expertise/Protective-Design-Center/PDC-Library/

Vehicle barrier systems that have demonstrated a vulnerability to a vehicle that falls within the parameter of the baseline threat and/or 'local' identified threat shall not be utilized. The baseline threat includes multiple attempts by the same vehicle (if not captured or rendered inoperable) but does not include a multiple vehicle threat.

C. Active Vehicle Barrier Markings and Delineation

i. The active vehicle barrier type selected will meet the following requirements:

The non-deployed active vehicle barrier shall not result in unsafe roadway or roadside obstructions. Active vehicle barrier shall include retro-reflective material that is visible on both sides of the barrier when the barrier is deployed.

ii. Active vehicle barrier red delineation lighting.

The following does not apply to vehicle barriers behind closed gates (gate marked with retroreflective road closure signage in accordance with MUTCD) and those utilized to close service drives (average traffic of 1 vehicle per day or less). These systems are not required to comply with the 'barrier red delineation lighting' criteria.

Red delineation lighting shall be provided to ensure the active vehicle barrier is clearly visible when the barrier is deployed. All delineation lighting shall be LED and each luminaire shall provide a sustained illumination level of 50 lumina. Active vehicle barrier system shall include the following alternatives:

The active vehicle barrier system shall include red flashing lights facing the direction of the threat vehicle and facing in the direction of vehicles traveling on the roadway. The lighting shall meet the following alternatives.

a. Alternative 1 - Bollard systems must include, as a minimum, one red led light per bollard.

b. Alternative 2a – Plate/wedge barrier systems equal to or greater than 3 feet in width will include, as a minimum, 3 red lights. One will be mounted within 1 foot of each barrier edge, and one will be mounted within 1 foot of barrier centerline.

c. Alternative 2b – Plate/wedge barrier systems less than 3 feet in width will include, as a minimum, 1 red light. One light will be mounted within 1 foot of the barrier centerline.

d. Alternative 3 - Crash beam barrier systems will include, as a minimum, 3 red lights. One will be mounted within 2 feet of the each edge of the driving surface. One light will be mounted within 1 foot of the center of each lane spanned by the barrier.

e. Alternative 4 – Net type barriers are not required to have lighting mounted on the barrier, but mitigation must be provided through use of in-roadway lighting.

f. Alternative 5 - Roadway Lighting (Alternative to barrier mounted red delineation lighting)

Red non-flashing roadway lighting shall be provided in the pavement on both sides of the barrier. A minimum of three shall be provided per lane per side.

D. Site Selection

i. Utility conflicts

Utility conflicts are not justification for modification of DOD active vehicle barrier system.

ii. Drainage

Drainage conflicts are not justification for modification of 'as tested' active vehicle barrier system(s).

iii. Sight distance

Sight distance will conform to the AASHTO Roadside Design Guide. Sight distance is for crest/sag curves and view when lane obstructions are present. OCONUS locations will conform to host nation criteria. If no equivalent host nation criterion exists, the AASHTO Roadside Design Guide shall be utilized.

iv. Roadside Safety/Clear Zones

Many active vehicle barrier systems include components that lie adjacent to the roadway. These components will be evaluated for their impact on driver sight distance.

E. Active Vehicle Barrier and Passive Vehicle Barrier Transitions

i. Foundation Conflicts

The 'as tested' foundation of the active vehicle barrier will not be modified.

ii. Acceptable Gaps

For locations where high-speed impact at significant angle (less than 40 mph and 60 degrees or kinetic energy equivalent) is not achievable, the clear distance between active vehicle barriers and adjacent passive vehicle barriers shall not exceed 5 feet.

For locations where high-speed impact at significant angle (greater than 40 mph and 60 degrees or kinetic energy equivalent) is achievable, the clear distance between active vehicle barriers and adjacent passive vehicle barriers shall not exceed 4 feet.

F. Maintenance:

Maintenance of the AVB system will be considered during the design, construction and selection of AVB systems.

i. During the time that an active vehicle barrier is undergoing maintenance the lane, the barrier signals may stay dark, green or go to red depending upon the safety scheme being

used. The measures taken during the maintenance of an active vehicle barrier shall be similar to that used for temporary lane closure during construction. Signage, marking and other measures will be in accordance with national roadway standards applicable for temporary lane closure. For OCONUS locations relevant host nation criteria related to temporary lane closure shall be utilized. If no applicable host nation criterion exists, the U.S. national standards shall be utilized.

ii. Active vehicle barrier systems should be maintained in accordance with manufacturer's recommendations.

iii. AVB O&M manuals developed by manufacturers often include requirements that are not feasible for the configuration of the access control point. In such cases the requirement will either be mitigated or an alternate product selected.

G. Active Vehicle Barrier Commissioning

i. Commissioning of active vehicle barriers will be in accordance with UFGS 34 75 13.13 "Crash Rated Active Vehicle Barriers and Controls".

ii. The active vehicle barrier system will be commissioned by the U.S. Army Corps of Engineers, Protective Design Mandatory Center of Expertise (PD-MCX) or a representative designated by the PD-MCX.

a. On-site commissioning effort will not take place until after the review of required commissioning related materials (as defined in the aforementioned UFGS) by the PD-MCX.

b. The endurance testing period identified in UFGS 34 75 13.13 may occur during normal ACP operations. However, it will include periodic (at least once daily) operation of the AVB system regardless of whether or not such operation is part of normal ACP operations.

H. Primary and Secondary ACPs

The AVBs will be permanent systems (not portable or transportable).

2.5.5. ID Check Area

A. ID Check Area Islands

i. Design shall provide opportunity for a guard to step out of guard booth onto a flat, relatively level surface or step.

ii. Locations where ID checks occur shall include all likely positions for such operations along and within the ID check island (for lighting and island surface).

B. ID Check Area Canopy

i. Individual canopy columns shall limit field of view from ID check guard booth by no more than 11 degrees. Where automated means include driver use of pedestal mounted credential validation, no canopy feature shall interfere with the view of this pedestal from the related ID check guard booth.

ii. Canopy shall provide 15 feet clear height where ACP use is limited to POVs.

iii. Canopy shall provide 17.5 feet clear height where commercial traffic is allowed.

iv. Canopy shall cover, as a minimum, routinely occupied guard positions and locations where drivers or pedestrians are required to interact with guards or equipment.

v. Foundations for canopy columns shall be raised at least 6" above adjacent surface to prevent corrosion of the steel columns, unless otherwise justified.

vi. Ceiling/underside of canopy roof should include reflective coating to aid light distribution.

vii. Canopy clear height shall include lighting, signage and all other objects or equipment hung from, or projecting from, the canopy.

viii. Provide an open/close visual indicator on the canopy over each lane that is controlled from the ID Check area or Command and Control.

ix. Communication and Security Systems – General Requirements. See paragraph 3.9 Communication and Security Systems.

x. Electrical – General Requirements. See paragraph 3.10 Electrical Requirements for electrical and lighting requirements.

C. Turn-Arounds

i. Definition - Turn-around 'lane' shall be defined as a median opening, widened area or other feature(s) devised to permit an inbound vehicle to move from the ingress to the egress lanes.

ii. Turnaround – For the turn around prior to the ID check the turning movement analysis shall, as a minimum, allow rejection of the largest common commercial vehicle allowed (without special permit) on the public roads near the Access Control Point.

iii. Rejection - For ACPs restricted to POV use; turning movement analysis for the rejection after the ID check shall, at a minimum, allow rejection of the largest POV common to public roadways leading to the Installation. Where commercial vehicles are allowed, turning movement analysis for the rejection after the ID check shall, at a minimum, allow rejection of the largest common commercial vehicle allowed on the public road leading to the Installation.

D. Remotely Manned Egress Only Vehicle ACPs

Do not require ID Check Area features due the absence of inbound traffic. No ID Check Islands or Canopies are required.

2.5.6. Search Area

Assumption must be that the search area will not be open 24/7. Search area lanes must be capable of closure during periods when search area is vacant.

A. Closure of search area lanes shall consist of one of the following:

i. Vehicle blockage - Utilize vehicle blockage to prevent or mitigate the inconspicuous movement of vehicles through the search area when the search area is unmanned. Blockage shall be sufficient to ensure that in the event of attempted circumvention, guards notice/are made aware of an attempted bypass.

ii. Delineation of closure with alarm for ID check location - Alarm annunciation will be audible (above traffic and other background noise) for guards in each ID check guard booth(s), at the command and command-and-control functional area and all areas under

the ID check area canopy where guards may be standing adjacent to inbound lanes conducting validation of credentials. Alarm levels will be 85 – 90 dB interior and 105 – 115 dB exterior to guard booth(s).

iii. Search Area Canopy

a. Canopy shall provide 15 feet clear height where ACP use is limited to POVs.

b. Canopy shall provide 17.5 feet clear height where commercial traffic is allowed.

c. Canopy clear height shall include lighting, signage and all other objects or equipment hung from, or projecting from, the canopy.

d. Canopy shall cover, as a minimum, the search lane(s) routinely occupied guard positions and locations where drivers or pedestrians are required to interact with guards or equipment.

e. Canopy or enclosed facility shall extend a minimum of 4 feet beyond these locations.

f. Ceiling/underside of structure should include reflective coating to aid light distribution.

g. Communication and Security Systems – General Requirements. See paragraph 3.9.

iv. Search Area Enclosed Facility

Where necessary for protection in extreme climatological areas/zones an enclosed facility may be utilized in lieu of a canopy. In locations with both a Search Area Enclosed Facility functional area and Search Area Office functional area, the two functional areas may be combined into one facility.

a. Enclosed Facility shall provide 15 feet clear height where ACP use is limited to POVs.

b. Enclosed Facility shall provide 17.5 feet of clear height where ACP allows commercial traffic.

c. Enclosed Facility clear height shall include the structure itself as well as lighting, signage and all other objects hung from, or projecting from, the underside of the roof structure, doorways, or other facets of the facility.

d. Enclosed Facility shall cover, as a minimum, the search lane(s) and the locations routinely occupied by guards as well as locations where drivers or pedestrians are required to interact with guards or equipment.

e. The inside of the Search Area Enclosed Facility should include a light reflective coating to aid in light distribution.

f. Ventilation of the Enclosed Facility shall be designed in accordance with all relevant standards related to ventilation of enclosed spaces which accommodate motor vehicles.

g. HVAC is required for enclosed occupied spaces (e.g. offices, waiting areas, etc.) within the Search Area Enclosed Facility.

h. HVAC is not normally feasible for the vehicle search bay(s). However, consider the use of radiant heating for northern climates.

i. Provide interior power outlets for offices or other spaces if they are included within the Search Area Enclosed Facility.

j. Provide interior power outlets for the Search Area Enclosed Facility. Outlets must be provided along the periphery of the Facility as well as near each search lane.

k. Provide exterior power outlets near the entry and egress points (both vehicular and pedestrian doors).

l. Provide Electronic Security, Duress Alarms and IDS

v. Search Area Shelter - A search area shelter is required in order to shelter occupants removed from vehicles being searched. This may be accomplished in the search area office (if provided), or in a standalone search area shelter. Consider obscuration in this location such that the search of the vehicle cannot be observed by its occupants.

vi. Inclusion of a Search Area Office – If the ACP will have a significant search area function that will be frequently manned by one or more personnel, a search area office must be considered. Proximity of other facilities must be considered. If no other facility is nearby and/or cannot be used by search area personnel, a search area office is recommended.

vii. Remotely Manned Egress Only Vehicle ACPs – No inbound traffic is allowed and, as a result, no search facilities are required.

2.5.7. Command and Control

A. Functional Location – The command-and-control function will be located in either the Access Control Zone or the Response zone. The location will be conducive to the monitoring of activities at and near the ID check area canopy as well as the rejection path for vehicles being turned away from the ID check area. The location will also allow monitoring of vehicles exiting the search area to ensure that proper actions are taken by those vehicles. For Remotely Manned Egress Only Vehicle ACPs the remote manning location will be considered an extension of the Access Control Zone.

B. Field of View - Shall include a view of the ID check area. View shall be direct if the command-and-control function is located within the control zone. If the command-and-control function is located within the response zone the view of ID check area will be augmented with CCTV where direct view is distant or limited. Remotely manned egress only vehicle ACPs will utilize CCTV to provide the required views. Monitor(s) presenting all required views will be provided for guards in the remote manning location.

C. Ballistic Rating

i. Ballistic rating shall protect against all feasible firing angles achievable from a ground-based attack from a direct fire weapon.

ii. Ballistic rating shall include ceiling/roof protection where the topography or the structures' location provides opportunity for direct fire from an elevated position (when angle is sufficient to impact guard standing and/or sitting at the counter).

iii. When combined with other facilities only the portion of the facility defined as Command and Control and all other areas specifically designated as requiring a ballistic rating shall require a ballistic rating. Under these circumstances, the requirement for a ballistic rating shall include both the exterior walls and the interior walls which separate the command-and-control function from other functional areas.

iv. Shall include, as a minimum, a UL 752 - Level 3 ballistic rating with a higher level being required if prescribed in a local threat analysis or policy.

D. HVAC

i. Requirement - The Command & Control function includes a requirement for ballistic protection. Ballistic rating precludes the feasibility of mechanical ventilation as an alternative to heating or air conditioning.

ii. Both heating and air conditioning shall be provided.

iii. Ballistic Rating - Building envelope penetrations created by HVAC components shall be mitigated to provide the same level of ballistic protection as the structure itself.

E. Provide exterior power outlet sufficient to power hand-held searchlights, and bug zappers etc.

F. Provide interior power outlet sufficient for radio chargers, and computers, etc.

G. Provide active vehicle barrier control console with enunciator, computer workstation, and communications equipment including Local Area Network (LAN), telephone, and Internet connections.

H. Communications. Provide a minimum of two (2) means of communications from the facility and with the Central Security Monitoring Station.

I. Electronic Security. Intrusion Detection. The entry doors to the Command and Control are to be equipped with Balanced Magnetic Switches (BMS) for intrusion detection.

J. Active Vehicle Barrier Controls

i. Provide emergency-fast-operate (EFO) controls for all active vehicle barriers related to the ACP.

ii. Panel is to have LED indicator lights showing whether or not the panel is functional and capable of barrier deployment.

2.5.8. Overwatch

A. The ACP will include an overwatch position in accordance with one of the following alternatives:

i. Overwatch Pad: The Overwatch pad alternative shall include size and pavement section capable of supporting the identified Overwatch vehicle. The minimum vehicle shall be that associated with a High-Mobility Multipurpose Wheeled Vehicle (HMMWV). The Overwatch pad includes Items 4) Location and 6) Communications and Security System below.

ii. Overwatch Facility: The Overwatch Facility alternative includes all the items listed below.

iii. Remotely Manned Egress Only Vehicle ACPs shall include AVB controls, alarm annunciation and other features associated with overwatch at the remote manning location.

B. Dimensions

Dimensions shall be sufficient for movement of guard personnel within the structure.

C. Fighting Position

Design must provide adequate space for movement of a guard and use of both handgun and shoulder fired weapon with gunports.

Gunports shall be provided on each face of the overwatch.

All gunports shall be usable for both handgun and shoulder fired weapons. Gunport design shall not require weapons to be oriented in an unusual way (e.g. gunport being placed immediately above counter and counter interfering with vertical orientation of pistol magazine).

D. Ballistic Rating

Overwatch facility shall include, as a minimum, UL 752- Level 3 ballistic rating.

A higher ballistic rating is required when such is identified during mandatory review of 'local' threat analysis and policy.

Ballistic ratings shall be provided for all walls, glazing, doors and frames.

A ballistic rating is required for the roof and/or floor only if direct fire striking of that surface is possible and the trajectory could result in guard impact.

E. Location

The overwatch position must be located such that it is near the AVBs but within site of the ID Check Area. The overwatch position will be utilized as a fighting position. If the AVBs and/or the ID Check Area are not directly observable, then observation will be supplemented by CCTV.

Remotely manned egress only vehicle ACPs shall utilize wrong way sensors and CCTV and other features to provide remote capabilities similar to an on-site Overwatch position.

F. Protection Against Errant Impact

Provide passive barrier protection for facility if located less than 3 feet behind the face of curb when adjacent to a curbed roadway section.

Provide passive barrier protection for facility if located less than 7 feet from the traveled lane when adjacent to a shouldered roadway section.

G. Communications and Security Systems

i. Active Vehicle Barrier Controls.

a. Provide emergency-fast-operate (EFO) controls for all active vehicle barriers related to the ACP.

b. Panel is to have LED indicator lights showing whether or not the panel is functional and capable of barrier deployment.

c. A full discussion on the requirements on Active Vehicle Barrier Controls can be found in paragraph 3.9 Communications and Security Systems of this document.

ii. Communications. Provide a minimum of two (2) means of communications from the facility and with the Central Security Monitoring Station, when present.

iii. Information Connectivity. Facility shall have LAN connectivity.

iv. Electronic Security. Intrusion Detection. The entry doors to the Overwatch Facility are to be equipped with Balanced Magnetic Switches (BMS) for intrusion detection.

v. CCTV. If the facility does not have a direct visual view of the ID Check Area, then provide necessary connectivity to the CCTV to allow CCTV monitors to be installed.

vi. Electrical Requirements

a. Provide interior power outlets sufficient for radio chargers, and computers, etc.

b. Electrical – General Requirements. See paragraph 3.10 Electrical Requirements.

2.5.9. Primary Spaces (Functional Areas)

A. Visitor Processing: Provide the capability to process visitors. The following elements may be included.

i. Vestibule

The vestibule is a small antechamber between the outer door of a building and an interior door. The vestibule saves energy by not allowing exterior conditions to enter the building. The space is not required to be ballistic rated but may be located in a blast resistant (hardened) building. If blast resistance is required, the wall of the vestibule opposite the door will need to be constructed of reinforced concrete or masonry to stop the door from traveling through the building in the event of a bomb blast.

ii. Waiting Room

The waiting area contains seating for people waiting processing on to the Installation. The space is not required to be ballistic rated.

iii. Processing Room

The processing area is normally an area with casework and cabinets that houses personnel who will verify credentials for temporary access onto the Installation. A counter is normally the only separation between the working personnel and those requiring a vehicle and individual passes. The space is not required to be ballistic rated.

iv. Break Room

The break room is space for eating or recreation of the personnel staffing the access control point. The space may also be used for interrogation of persons of interest. The space is not required to be ballistic rated.

v. Office

The office is a space where the supervisor may be located. The space may be used to perform interviews and appraisals and requires sound deadening materials within the walls to reduce the amount of sound transfer. The space is not required to be ballistic rated.

vi. Provost Marshal/ Military Police

The Marshal/ Military Police occupies office space within the facility. The space may be used to perform interviews of persons of interest and requires sound deadening materials within the walls to reduce the amount of sound transfer. The space may also be used to detain such persons and is required to have a separate exterior entrance to allow detainees to be removed from the building without encountering anyone within the waiting area. The space is not required to be ballistic rated but may be located in a ballistic rated or blast resistant (hardened) building.

vii. ID Check Area Canopy

The ID Check Area Canopy will be a structure that covers the islands of the ID Check Area. The canopy height will be a minimum 15’-0” clear height above the road surface if only automobiles will be using the ACP but will be increased 17’-6” clear height above the road surface if oversize vehicles such as firefighting equipment would need to pass under the canopy. The roof of the canopy can be in any configuration but should be in conformance with the Installation Design Guidance. The canopy structure shall be designed by a registered professional engineer. Less than 11 degrees of obscuration of vision from the Guard Booth shall be maintained.

viii. ID Check Guard Booth

Ballistic resistant guard booths will be installed on islands adjacent to each incoming lane of traffic under the ID Check Canopy for protection of guards performing vehicle/passenger ID checks. Locate Guard Booths on a raised island in the ID Check Area under the ID Check Canopy. Guard booths can be pre-manufactured units. Guard booths are not required to be ABA/ADA compliant. Guard booths shall have sliding doors and a counter.

ix. Search Area Shelter

The search area shelter is a space to house individuals whose vehicles are being searched. The space should hold persons for the short time their vehicle is being inspected. The space should have large windows on the exterior to observe the people within the space and allow the inspectors to observe occupants. The space is not required to be ballistic rated. The function is not normally located in a blast protected building. Depending on installation requirements, this may either be a bus stop type shelter or building.

x. Truck Search Area Canopy

Canopy: The Truck Search Canopy will be a structure that covers the Truck Search Area. The canopy shall be sized for one or more of the largest vehicles expect to enter the Installation. The canopy height will be a minimum 17’-6” clear height above the road surface. The roof of the canopy can be in any configuration but should be in conformance with the Installation Design Guidance. The canopy structure shall be designed by a registered Professional Engineer.

Enclosed Facility: The Truck Search Enclosed Facility will be a structure that encloses the Truck Search Area. The facility shall be sized for one or more of the largest vehicles expected to enter the Installation. The clear height of the facility will be a minimum of 17’-6” above the surface of the roadway. The roof of the facility can be in any configuration but should be in conformance with the Installation Design Guidance.

xi. Passenger Vehicle Search Area Canopy

Canopy: The Passenger Vehicle Search Canopy will be a structure that covers the Passenger Vehicle Search Area. The building shall be large enough to allow the searching of a minimum of two vehicles at a time. The canopy clear height will be a minimum 15’-0” clear above the road surface. The roof of the canopy can be in any configuration but should be in conformance with the Installation Design Guidance. The canopy structure shall be designed by a registered Professional Engineer.

Enclosed Facility: The Passenger Vehicle Search Enclosed Facility will be a structure that covers the Passenger Vehicle Search Area. The facility shall be large enough to allow the search of, as a minimum, two vehicles at a time. The clear height above the road surface will be a minimum or 15’-0”. The roof of the facility can be in any configuration but should be in conformance with the Installation Design Guidance.

xii. Command- and- Control

The Command-and-Control area will contain the controls to activate the AVB in the event of an unauthorized vehicle tries to penetrate the installation's perimeter. The Command-and-Control area shall have a clear view of all ID Check area, and if possible, the Search Area Canopies. Due to the function of this area the public will not be allowed to enter the area. Therefore, this function/room is not required to be ABA/ ADA compliant. The function will be protected with ballistic resistant construction.

Remotely Manned Egress Only Vehicle ACPs will meet the requirements of the Command-and-Control Functional Area at a remote location.

xiii. Toilet

Toilets can be unisex units or single sex units, sized in accordance with ABA/ ADA criteria. The toilets shall be handicapped accessible with grab bars, tilted handicapped mirrors, etc. All toilet accessories are to be mounted in accordance with ABA/ ADA criteria unless the toilet is to be operated by only able-bodied personnel. Toilets operated by able bodied personnel shall not be required to meet ABA/ ADA requirements but must follow ABA/ADA to the greatest extent feasible.

xiv. Janitor's Closet/Inside Storage

The room may contain cleaning supplies, mops, a mop rack, mop bucket and a mop sink. Space is not normally ballistic resistant construction.

xv. Outside Storage

The Outside Storage function will house equipment used within the ID Check and Search Area. Equipment may include traffic cones, and mirrors used for vehicle inspection. The building can be a prefabricated storage unit or stick built construction. The building may be located on a raised curb under the ID Check Canopy. The function does not require ballistic protection.

xvi. Electrical/Communications Room

Electrical/ Communications room shall be sized to accommodate all required equipment. This functional space houses communications equipment, telephone equipment, along with space for CCTV equipment racks, and back-up generator equipment, used in the operation of the access control point. Equipment shall be arranged in the facility to maintain individual security and access. Equipment shall be located in secure areas within the facility. Some space may require separate entrances. This functional space also includes mechanical equipment necessary to heat and/or cool the equipment.

xvii. Pedestrian ID Check

The Pedestrian ID Check area occupied by guard personnel shall be ballistic rated. Pedestrian ID Check can be pre-manufactured or stick built construction. The Pedestrian ID Check area occupied exclusively by guard personnel is not required to be ABA/ADA compliant, however any area utilized by pedestrians during the vetting process shall be ABA/ADA compliant. A Pedestrian ID Check functional area with no pedestrian pass-through shall have a single door with a counter. The counter will include a deal tray for the passage of identification, and a speaking port to allow communication between the guard and persons wishing to enter the installation.

xviii. Miscellaneous Functional Elements

The following items may be included:

a. Janitor's Closet/Inside Storage

The space contains cleaning supplies, mops, a mop rack, mop bucket and a mop sink. The space does not require a ballistic rating may be located in a blast resistant building.

b. Recycle Room

The space contains bins for recycled materials. The space does not require a ballistic rating may be located in a blast resistant building.

c. Standalone Storage Building

The facility will house equipment used at the I.D. Check Canopy such as cones, and vehicle inspection mirrors. k The facility does not require ballistic or blast protection.

B. Overwatch Position

i. Overwatch Building

Ballistic resistant Overwatch building installed near the active barrier and providing occupant(s) the ability to oversee response zone traffic and operations at the ID Check Area. The Overwatch building may be a pre-manufactured unit or stick built. The Overwatch building is not ABA/ADA compliant. The Overwatch building is a fighting position and shall be equipped with gunports to allow for the occupant to respond to inbound threats. Overwatch building shall have a 360 degree360-degree field of view.

ii. Overwatch Pad

A paved pad designed to accommodate at a minimum one High-Mobility Multipurpose Wheeled Vehicle (HMMWV). This pad includes a pedestal for AVB controls.

2.5.10. Combinations/Square Foot Limitations for Various Functional Areas

The following represent standard designs for both functional areas and combinations of functional areas. Square footage limitations for these designs are listed in the Army Standard. Other functions may be combined even though it might not be addressed in the Army Standard or this document.

A. Gatehouse - Includes command and control, toilet, janitor's closet/inside storage, outside storage, mechanical/ electrical room and communications room. Ooutside storage is optional.

B. Command and Control - Includes command and control, toilet, janitor's closet/inside storage, and a mechanical/electrical room.

C. Toilet Small Search Building –Includes office, break room, toilet, janitor's closet/inside storage, mechanical/electrical room, communications room, and outside storage.

D. Large Search Building –Includes processing room, waiting room, provost marshal room, break room, toilet, janitor's closet/inside storage, mechanical/electrical room, communications room, and outside storage.

E. ID Check Canopy – Varies with the number of lanes.

F. Passenger Vehicle Search Area Canopy or Enclosed Facility – Varies with the number of lanes and configuration.

G. Truck Search Area Canopy or Enclosed Facility – Varies with the number of lanes and configuration.

H. Two (2) Processor Visitor Control Center – Includes waiting and processing room, vestibule, toilet, janitor's closet, break room, mechanical/electrical room, and communications room.

I. Three (3) and Six (6) Processor Visitor Control Center – Includes waiting room, processing room, vestibules, janitor's closet, toilets, break room, office, dedicated provost marshal room, mechanical/electrical room, and communications room.

J. Nine (9) Processor Visitor Control Center – Includes waiting room, processing room, vestibules, toilets, break room, office, dedicated provost marshal room, janitor's closet, storage room, mechanical/electrical room, and communications room.

2.6. SITE FUNCTIONAL REQUIREMENTS

2.6.1. General

A. Location and construction of the new facilities including associated structures, roads, parking, and utilities and landscaping shall be as indicated and as specified herein. All site layout changes are subject to review and approval by the Government. Government supplied site plans are provided to assist the Contractor in the preparation of their proposal and design. Any errors identified shall be brought to the attention of the Contracting Officer immediately for resolution and direction. Take all professionally prudent and reasonable actions to verify the accuracy of the data provided. The Contractor is responsible for final site plans.

B. Installation Physical Security and Antiterrorism requirements that are in addition to the requirements of this section will be included in a separate document. [RFP Wizard: See Part 3 for any additional security requirements required by the installation Physical Security and Antiterrorism including the requirements in this section.]

C. Visitor Control Center

i. The Visitor Control Center (VCC), if present, shall be placed such that the processing of visitors is done prior to entry into the Installation. This shall mean that the visitor vetting is conducted prior to inbound traffic (vehicular and pedestrian) reaching the ID check and search area.

ii. The VCC parking and driveway shall not provide undetected bypass of the ID check area.

D. ID Check Area

i. The ID check area shall be configured in a manner that allows ID check guards to be aware of all inbound vehicle and pedestrian traffic.

E. Overwatch Position

i. The overwatch position is both a location for overwatch and a potential fighting position. As such it shall be located in a position where a guard within the structure has some ability to defend the Installation from a potential threat in the ACP response zone.

ii. Overwatch firing ports will be oriented to allow guards to fire from all sides of the position. Specific consideration will be given to the most likely threat locations. This shall include the response zone near the final denial active vehicle barriers.

F. Search Area

i. Search area(s) shall present the opportunity for vehicles to be designated for search prior to the ID check and must also support search for those vehicles selected for search at the ID check location.

ii. The search area must not provide opportunity for undetected bypass of the ID check area. The design will not be based on the search area being in operation during the entire time that the ACP is open. During closure the design must anticipate search area being unmanned at times and vehicle resistant measures and/or alarm and annunciation provided for ID check guards if a vehicle travels through toward the search area when it is closed.

2.6.2. Parking

A. Vehicle Parking

i. Provide clear and convenient traffic flow through and around the ACP parking areas and access drives that maximizes functional capabilities but minimizes traffic conflicts. If required coordinate inter-modal traffic within the ACP site.

ii. Provide sufficient parking spaces for the anticipated number of visitors and personnel at the ACP. See Military Surface Deployment and Distribution Command, Transportation Engineering Agency (SDDCTEA) Pamphlet 55-15 for the methodology to be used in determining the number of visitor parking spaces required. Provide ramps serving the handicapped spaces for access.

iii. Privately Owned Vehicle (POV) parking is to be off-street parking. Area lighting and landscaping is to reinforce the parking area while meeting functional and safety requirements. Pavement markings shall comply with MUTCD. [RFP Wizard: Minimum flexible and concrete pavement thickness and pavement calculations shall comply with the installation design guide and any additional requirements identified in Part 3.]

2.6.3. Access Roadways, Drives and Islands

A. Roadways and Access Drives: Design roadways to accommodate expected vehicles in the design, including, but are not limited to, passenger cars, emergency vehicles, garbage trucks, fire trucks, military vehicles, delivery service, utility vehicles, commercial vehicles and bicycles if present. The minimum roadway width in the approach and response zones is 11 feet. The minimum roadway width at the ID Check Area is 10 feet, but 11-12 feet is preferred. All roadway horizontal and vertical alignments must properly address the turning radius of the design vehicle(s). Pavement design shall follow the UFC or other approved methods. Host nation methods for determining concrete pavement section may be utilized where present. If no such documentation exists, the aforementioned minimum applies. [RFP Wizard: Minimum flexible and concrete pavement thickness and pavement calculations shall comply with the installation design guide and any additional requirements identified in Part 3.]

B. Devices in Pavements: Devices installed in the roadway surface will be rated for exterior use and will be installed in a manner which resists or avoids impact by snowplows. Housings for such devices will be metal capable of resisting corrosion. Recess devices where necessary to avoid snowplow impact.

C. ID Check Area Islands: Traffic islands in the ID Check Area are to be, at a minimum, 10 feet in width. Medians at the ID Check Area shall be a minimum of 10 feet in width.

D. ID Check Area Hardstand: ID Check Area will consist of a concrete hardstand extending a minimum of 3 feet before and after the ID Check Islands and canopy.

2.7. SITE AND LANDSCAPE REQUIREMENTS

2.7.1. Site Structures

A. Dumpsters: Dumpsters are not a requirement of the Army Standard Design, but maybe incorporated at the request of the installation.

i. Provide concrete pads and dumpster screen wall enclosure. Ensure minimum UFC 4-010-02 “DoD Minimum Antiterrorism Standoff Distances for Buildings” between the building and dumpster location is complied with. Construct the screen wall enclosures of materials to match the new facility exterior walls. Coordinate color with the installation. Integrate a gate keeper capable of holding the entry gate(s) in an open position and a locking mechanism into the entry gate design consistent with DA fence requirements.

ii. Coordinate with the Installation on the required recycling dumpsters (or storage containers). Collocate, but separate recycling dumpsters (or containers) with the dumpsters and screened as per dumpsters.

2.7.2. Landscaping/Hardscaping

A. Landscaping:

i. Lines-of-Sight

a. Landscaping shall not obscure lines of sight. Lines-of-sight shall be determined by the mature growth of trees and other plantings. Provide clear lines of sight between guards and the following functions:

b. Vehicle ID Check Guard Booth guards view of vehicle and driver during the vetting process will not be obstructed.

c. Pedestrian ID Check guards view of pedestrian being processed will not be obstructed.

d. Overwatch position view of ID Check Area.

e. Command and Control view of ID Check and Search Area exits.

f. Landscaping shall not infringe on sight distance for drivers. Sight distance shall bas defined in the AASTHTO Green Book (or applicable host nation criteria). If the specific issue of sight distance is not addressed by host nation criteria the AASHTO documentation shall be utilized.

ii. Make selection of landscape materials from among species well adapted to the region and consider maintenance requirements. Focus landscaping concepts on desirable environmental effects such as windbreaks, shade, and screening of undesirable views and definition of desirable enclosed areas.

iii. The landscaping plan is also to consider the irrigation requirements. Ideally, the selected species are to be native and drought resistant such that a permanent irrigation system is not required. In the event that a permanent irrigation system is required, include as a minimum, a backflow prevention and pop-up or drip type sprinkler heads.

B. Sidewalks: Provide an ample functional system of walks connecting structures, parking area(s), street(s), and other sidewalk(s) as pedestrian traffic demands. In addition, review paths of travel to determine a layout of sidewalks that is sufficient to meet the likely paths of travel. Slopes of all sidewalks are required to meet all requirements for ADA Accessibility Guidelines (ADAAG). Pedestrian sidewalks are to be a minimum of 6 feet wide and 10 feet wide for those anticipated to have bidirectional bicycle traffic. Construct pedestrian sidewalks of Portland Cement Concrete having a minimum 3,000 psi compressive strength. Conformance with Architectural Barriers Act

(ABA) is also required. Host Nation methods for determination of concrete section and strength may be utilized.

2.7.3. Site Design Requirements

For all site design requirements, excluding line-of-sight requirements, Host nation criteria may be used in lieu of the contents of this section. Use the requirements described in this section, if host nation criteria does not specifically address any of the features described herein.

A. Grading:

   i. Provide positive drainage for all areas and use existing drainage ways to the extent possible. It is desirable to direct drainage away from buildings to curb and gutter or road ditches. Avoid swales between buildings and parking areas, if possible. Grade parking areas such that storm water is directed off to the sides, with curbs and gutters to control drainage, and not down the center of the parking area, where possible. Balance earthwork to the extent possible without compromising the design. Keep the number of existing trees to be removed to a minimum. No grading is to be done within drip lines of existing trees to be preserved.

   ii. Design grading such that visual lines of sight are maintained throughout the ACP corridor between the major functional areas (Gatehouse, active vehicle barriers, Guard Booths, Search Area Building, Visitor Control Center, Vehicle Search Area, ID Check Area, etc.).

   iii. Comply with AASHTO Green book for vertical roadway profiles.

B. Line of Sight: Individual obstructions, to include canopy columns, shall not cause more than 11-degree interruption of line of sight of the inbound lanes (in both directions – both upstream and downstream) from vehicle ID Check guard booths and other routinely occupied vehicle ID Check guard locations.

C. Adjustment of Existing Structures: Adjust all manholes, valve boxes, or inlets of any nature within the project that do not conform to the finished grade in either surfaced or unsurfaced areas to the finished grade. Where inlets, manholes, or valve boxes fall within a surfaced or unpaved roadway or parking, remove the existing frames and cover and replace with a heavy-duty frame and cover. Adjust the structure as needed to fit the new conditions. Provide structures of a type suitable for the intended use and conforming to the requirements of the applicable sections herein.

D. Sidewalks: Provide concrete sidewalks with a transverse grade of 2 percent. The maximum longitudinal sidewalk grade adjacent to the roadway shall be less than or equal to the adjacent roadway grade. Sidewalks without railings shall have a maximum grade not to exceed 5 percent. Sidewalks with handrails and landing shall have a maximum slope of 8.333 percent (1V:12H) slope with 5 feet level landings at 30 feet maximum spacing and at the top and bottom of the slope. See Uniform Federal Accessibility Standards for additional requirements.

E. Stairs: Avoid the use of stairs in sidewalks whenever possible, this is especially important throughout the ACP. When stairs are unavoidable, they should have at least three risers and shall be provided with handrails. Provide all steps within a stair to have a uniform tread width and riser height. Provide risers with a height of 4.5 to 6 inches and treads with a width of 12 to 17 inches. Treads should slope 2 percent for positive drainage. Keep the height between landings to a maximum of 5 feet to allow a view of the next higher landing whenever possible. The height between landings is not to exceed 12 feet. Provide landings that are at least 4 feet long.

F. Transverse Parking Area Grades:

i. Desirable minimum of 2 percent.

ii. Absolute minimum of 1.5 percent for flexible pavement and 1 percent for rigid pavement.

G. Longitudinal Parking Area Grades: Maximum of 5 percent.

H. Road and Street Longitudinal Grades: Preferred maximum longitudinal road and street grades of 5 percent. Use of longitudinal road and street grades greater than 7 percent shall not be used.

I. Ramp Grades:

i. Desirable maximum of 7 percent.

ii. Absolute maximum of 10 percent for short distances only.

J. Gutter Grades:

i. Desirable minimum of 0.8 percent.

ii. Absolute minimum of 0.5 percent.

K. Building Floor Elevation: Set building finished floor elevation to ensure that the required minimum and maximum grades are met. Construct first floor of new buildings a minimum of 1 foot above the 100-year flood plain elevation, if applicable.

L. Grades Away from Building:

i. Minimum Soil Grade: 5 percent for 10 feet.

ii. Maximum Soil Grade: 10 percent for 10 feet.

iii. Sidewalk or Paved Grade: Preferred is 2 percent, maximum is 4 percent, and this shall be subject to approval by the Contracting Officer. This is especially important where sidewalks transition between the buildings and adjacent roadways or drives that have vehicle traffic.

M. Overlot Grades:

i. Minimum 1 percent for cohesionless sandy soils.

ii. Minimum 2 percent for cohesive soils or turfed areas.

iii. Side slopes for ditches, roads, and other turfed areas shall be no steeper than 3 Horizontal to 1 Vertical (3H:1V), preferred is 4 Horizontal to 1 Vertical (4H:1V). A 10-foot-wide shelf shall be constructed every 15 feet in elevation change on all cut and fill slopes. Retaining walls are an option to limit the amount of cut and fill.

N. Ditches: Grade ditches at non-erodible slopes or line the ditch with an appropriate material to prevent erosion. Use a design storm with a return period of at least 10 years to determine erodibility of ditches and swales. Provide the depth of ditches along pavement shoulders such that the water surface from the 10-year design storm is below pavement subbase and base courses which daylight through the adjacent shoulder.

O. Storm Drainage System: Comply with host nation requirements for storm drainage requirements. If no applicable host nation requirement exists, comply with UFCs requirements. Comply with the appropriate UFCs requirements for design, construction and material specified for storm drainage installation. State’s DOT requirements maybe used with Government approval. Use reinforced concrete pipe (RCP) with watertight joints for all storm drainage lines constructed under road, parking area and or surfaces subject to vehicular traffic.

P. Canopy Stormwater Drainage System: All drainage from canopy roofs shall be collected and either discharged into a storm drain system or onto non-paved areas with positive drainage. Roof drainage shall not be discharged onto islands, pavements, sidewalks, or any other areas that people or vehicles regularly access.

Q. Building Stormwater Drainage System: Stormwater from building roofs shall be collected and will be either discharged into a subsurface stormwater drainage system or onto non-paved areas in areas unlikely to be accessed by guard personnel or pedestrians. Provide positive slope away from facilities, roadways, sidewalks and other areas that may be accessed by pedestrians or vehicles.

R. Asphalt Pavement: Provide asphalt aprons, roads and parking areas per project requirements. Construct the asphalt areas with concrete curb and gutter at the project specific locations.

S. Concrete Pavement: Provide concrete pavement per project specific. Construct the concrete pavement with the curb type at project specific locations, minimum 6 inches high.

T. Traffic Signage, Pavement Markings and Striping: Provide traffic signage, pavement marking and striping for all roads and parking areas. Design signage, pavement markings and striping in accordance with MUTCD for Streets and Highways. Provide retro-reflectorized signs according to the minimum requirements of ASTM D 4956-07e1, Type III sheeting. Provide non-reflectorized paint for parking areas. Stripe roads and streets with reflectorized paint.

U. Exterior Signage: To be in accordance with installation requirements.

2.7.4. Minimum Anti-terrorism Standards for ACP Buildings

A. General

ACP structures shall be sited, designed and constructed in accordance with the minimum requirements of UFC 4-010-01, “DoD Minimum Antiterrorism Standards for Buildings”. Facilities which are, by occupancy, considered “inhabited structures”, per the criteria, which cannot be sited to meet conventional construction standoff distance requirements from threats, shall be designed as hardened facilities.

B. Standoff

Shall be in accordance with UFC 4-010-01” Minimum Antiterrorism Standards for Buildings.”

Standoff shall consider a moving vehicle threat scenario within the ACP corridor.

The element of UFC 4-010-01 that has the most significant impact on project planning is providing protection against explosives effects. That protection can either be achieved using conventional construction (including specific window requirements) in conjunction with establishing relatively large standoff distances to parking, roadways, and installation perimeters or through building hardening, which will allow lesser standoff distances. Even with the latter, the minimum standoff distances cannot be encroached upon. These setbacks will establish the maximum buildable area. All standards in Appendix B of UFC 4-010-01 must be followed. In addition to the UFC cited in this paragraph UFC 4-020-02FA, (2005) “Security Engineering: Concept Design”; UFC 4-020-03FA, (2005) “Security Engineering: Final Design”; UFC 4-020-04FA, (2005) “Electronic Security Systems: Security Engineering”; and UFC 4-021-01 “Design and O&M Mass Notification Systems” apply to the facility.

C. Visitor Control Center (VCC) and Multi-Function Building Combination

VCC Standard design facilities and multi-function building combinations where occupancy level is greater than 11 persons may necessitate standoff in compliance with UFC 4-010-01 depending on site placement of these facilities.

2.8. ARCHITECTURAL REQUIREMENTS:

2.8.1. General Requirements

The requirements below include both separate functional requirements and example combination of functional requirements, where identified.

A. Two (2) Processor Visitor Control Center (See drawings)

Visitor Control Center shall have occupancy under 11 persons and shall be considered an unoccupied facility and is not required to have blast resistant construction. The facility is non-ballistic rated construction. This Visitor Control Center contains, but not limited to, the following:

i. Waiting and Processing: Provide seating for visitors. The processing area will contain casework for processing operations.

ii. Vestibule: Provide exterior and interior vestibule doors with panic hardware.

iii. Toilet: Provide privacy lockset.

iv. Break Room/Provost Marshal Room: Provide passage latch set. Provide at least STC 45 sound rated walls. Provide a microwave and refrigerator. Verify if arms storage or personal lockers are required. Separate exterior door will be provided to allow the removal of arrested individuals, exterior door to have no exterior trim.

v. Mechanical/ Electrical room: Provide entry doors with locksets (coordinated keying with installation groups responsible for maintenance and operation).

vi. Communications room: Provide entry doors with locksets (coordinate keying with installation groups responsible for maintenance and operation).

vii. Janitor's Closet: Provide mop sink and mop holder with shelf.

B. Three (3) Processor Visitor Control Center (See drawings)

The Visitor Control Center is non-ballistic rated construction but may require blast rated construction based on stand-off distance (for hardened structures). This Visitor Control Center contains, but not limited to, the following:

i. Waiting Room: Provide seating for visitors.

ii. Processing Area: Provide raised flooring with ramp access and, if feasible, stair access. The processing area will contain casework for processing operations.

iii. Vestibules: Provide exterior and interior vestibule doors with panic hardware.

iv. Toilets: Provide privacy lockset.

v. Break Room: Provide latch set. Provide a microwave and refrigerator. Provide space for recycling receptacle. Verify if arms storage or personal lockers are required.

vi. Office: Provide office lockset. Provost Marshal Room: Provide office lockset on interior door. Provide at least STC 45 sound rated walls. Separate exterior door will be provided to allow the removal of arrested individuals, exterior door to have no exterior trim.

vii. Mechanical/ Electrical room: Provide entry doors with locksets (coordinated keying with installation groups responsible for maintenance and operation).

viii. Communications room: Provide entry doors with locksets (coordinate keying with installation groups responsible for maintenance and operation).

ix. Janitor's Closet: Provide mop sink and mop holder with shelf.

C. Six (6) Processor Visitor Control Center (See drawings))

The Visitor Control Center is non-ballistic rated construction but may require blast rated construction based on stand-off distance (for hardened structures). This Visitor Control Center contains, but not limited to, the following:

i. Waiting Room: Provide seating for visitors.

ii. Processing Area: Provide raised flooring with ramp access and, if feasible, stair access. The processing area will contain casework for processing operations. Vestibules: Provide exterior and interior vestibule doors with panic hardware.

iii. Vestibules: Provide exterior and interior vestibule doors with panic hardware.

iv. Toilets: Provide privacy lockset.

v. Break Room: Provide latch set. Provide a microwave and refrigerator. Provide space for recycling receptacle. Verify if arms storage or personal lockers are required.

vi. Office: Provide office lockset.

vii. Provost Marshal Room: Provide office lockset on interior door. Provide at least STC 45 sound rated walls. Separate exterior door to allow the removal of arrested individuals, exterior door to have no exterior trim.

viii. Mechanical/Electrical room: Provide entry doors with locksets (coordinated keying with installation groups responsible for maintenance and operation).

ix. Communications room: Provide entry doors with locksets (coordinate keying with installation groups responsible for maintenance and operation).

x. Janitor's Closet: Provide mop sink and mop holder with shelf.

D. Nine (9) Processor Visitor Control Center (Drawing Not Included)

The facility is non-ballistic rated construction but may require blast rated construction based on stand-off distance (for hardened structures). This Visitor Control Center contains, but not limited to, the following:

i. Waiting Area: Provide seating for visitors.

ii. Processing Area: Provide raised flooring with ramp access and, if feasible, stair access. The processing area will contain casework for processing operations.

iii. Vestibules: Provide exterior and interior vestibule doors with panic hardware.

iv. Toilets: Provide privacy lockset.

v. Break Room: Provide latch set. Provide a microwave and refrigerator. Provide space for recycling receptacle. Verify if arms storage or personal lockers are required.

vi. Office: Provide office lockset.

vii. Provost Marshal Room: Provide office lockset on interior door. Provide at least STC 45 sound rated walls. No ballistic protection required. Separate exterior door to allow the removal of arrested individuals, exterior door with no exterior trim.

viii. Mechanical/Electrical room: Provide entry doors with locksets (coordinated keying with installation groups responsible for maintenance and operation).

ix. Communications room: Provide entry doors with locksets (coordinate keying with installation groups responsible for maintenance and operation).

x. Janitor's Closet: Provide mop sink and mop holder with shelf.

xi. Storage Room: The space will be for dedicated storage. Provide standard utility space lockset.

E. ID Check Canopy (See drawings)

The ID Check Canopy will be a roof structure supported by columns that covers the islands and entry lanes of the ID Check Area. It is desirable to clad the structural members and provide soffits to the underside of the structure to prevent birds from nesting on the exposed legs of the steel beam flanges.

F. Vehicle ID Check Guard Booth (See drawings)

Ballistic rated construction. Provide 360-degree field of view. Provide two sliding ballistic rated doors with hardware. Provide at least 32-inch-deep stainless-steel countertop. Roof requires ballistic rating only where direct fire threat is possible from an elevated position.

G. Search Function Bus Shelter

The three-sided or four-sided glass and aluminum pre-manufactured bus shelter will have a wood or metal bench and doors, where needed. Bus shelter size may vary with search area traffic volume and manufacturer provided. Glazing shall be clear to allow guards to maintain visual contact with persons whose vehicle is being inspected. Ballistic rated construction is not required.

H. Small Search Area Building(s) (See drawings)

The Small Search Area Building(s) will be located adjacent to the Vehicle Search Area(s) to support the Search Area guards in performing their activities by providing a space for vehicle occupants to go during the vehicle inspection process. The Enclosed Search Area Facility will include additional CCTV to mitigate the loss of direct line of sight from other areas within the ACP Control Zone. The building will be designed and constructed to be Architectural Barriers Act (ABA) and Americans with Disabilities Act (ADA) Accessibility Guidelines compliance. Ballistic rated construction is not required. The Small Search Area Building contains, but not limited to, the following:

i. Waiting room/Office: Provide door with entry door hardware. Provide seating for visitors.

ii. Break room: Provide latch set and a microwave and refrigerator.

iii. Toilet: Provide privacy lockset.

iv. Janitor's Closet/Inside Storage: Provide standard utility space lockset. Provide mop sink and mop holder with shelf.

v. Communications Room: Provide entry doors with locksets (coordinated keying with installation groups responsible for maintenance and operation).

vi. Mechanical/ Electrical room: Provide entry doors with locksets (coordinate keying with installation groups responsible for maintenance and operation).

vii. Outside Storage: Provide entry door with locksets.

I. Large Search Area Building (See drawings)

The Large Search Area Building is located adjacent to the Vehicle Search Area to support the Search Area guards in performing their activities by providing a space for vehicle occupants to go during the vehicle inspection process. The Enclosed Search Area Facility will include additional CCTV to mitigate the loss of direct line of sight from other areas within the ACP Control Zone. The building will be designed and constructed to be Architectural Barriers Act ABA and Americans with Disabilities Act (ADA) Accessibility Guidelines compliant. At OCONUS locations host nation accessibility criteria may be utilized in lieu of ABA/ADA requirements. If no host nation criteria exists, the project will comply with ABA/ADA. Ballistic rated construction is not required for this facility. The Large Search Area Building contains, but not limited to, the following:

i. Optional X- Ray/Metal Detector: Provide a pair of doors with panic hardware on active leaf and lever action flush bolts on inactive leaf.

ii. Office/Provost Marshall Room: Provide interior door with office lockset. Provide separate exterior door to allow the removal of arrested individuals and make it have an entry door lockset.

iii. Toilet: Provide privacy lockset.

iv. Visitor Processing:Two (2) processors with office door with office lockset.

v. Break Room: Provide latch set and a microwave and refrigerator.

vi. Outside Storage: Provide entry door with utility room lockset.

vii. Mechanical/ Electrical room: Provide entry doors with locksets (coordinated keying with installation groups responsible for maintenance and operation).

viii. Communications room: Provide entry doors with locksets (coordinate keying with installation groups responsible for maintenance and operation).

ix. Janitor’s Closet/Inside Storage: Provide standard utility space lockset. Provide mop sink and mop holder with shelf.

x. Waiting room: Provide seating for visitors.

J. Truck Search Area Canopy (See drawings)

Canopy: The Truck Search Canopy will be a structure that covers the Truck Search Area. The roof of the canopy can be in any configuration, must conform with the Installation Design Guide. The canopy structure shall be designed by a registered Professional Engineer. Screening of search operations from casual observation should be considered. The structure may include screen walls as part of the canopy design.

Enclosed Facility: The Truck Search Enclosed Facility will be a structure that encloses the Truck Search Area. The roof of the facility can be any configuration that conforms to the Installation Design Guide. This facility shall be designed by a registered Professional Engineer. The Enclosed Facility may not require additional measure to screen from casual observation; however, it should still be considered during planning and design.

K. Passenger Vehicle Search Area Canopy (See drawings)

Canopy: The Passenger Vehicle Search Canopy will be a structure that covers the Passenger Vehicle Search Area. The roof of the canopy can be in any configuration, must conform with the Installation Design Guide. The canopy structure must be designed by a registered professional engineer. Screening of search operations from casual observation should be considered. The building may include screen wall(s) as part of the canopy design.

Enclosed Facility: The Passenger Vehicle Search Enclosed Facility will be structure that encloses the Passenger Vehicle Search Area. The roof of this facility can be of any configuration that conforms to the Installation Design Guide. This facility shall be designed by a registered Professional Engineer. The Enclosed Facility may not require additional measure to screen from casual observation; however, it should still be considered during planning and design.

L. Command-and-Control Function/Room

The Command-and-Control functional area will enable guards' oversight of the ID Check and Search Areas and will contain the master controls to activate the AVB in the event of an unauthorized vehicle tries to penetrate the ACP. The facility must have a 180-degree un-obstructed view. Areas not directly observable from the Command and Control can be monitored by closed circuit television (CCTV). Due to the function of the building, the public will not be allowed to enter therefore the facility is not required to be ABA/ADA compliant. All areas shall be ballistic rated. Roof requires ballistic rating only where direct fire threat is possible from an elevated position. The room is not required to be blast resistant. Casework provided in this function must be at least 2’ 6” in depth.

M. Gatehouse (See drawings)

Gatehouse shall be located to allow guards to observe and oversee the Identification (ID) Check Area, the exits from search areas, and must have a 180-degree un-obstructed view. Areas not directly observable from the Command-and-Control room can be monitored by closed circuit television (CCTV). A control panel for the Active Vehicle Barrier (AVB) will be located in the Command-and-Control room of the building and will activate the AVB in the event of an unauthorized vehicle tries to penetrate the ACP. The Gatehouse will be located on a raised island immediately after the last turn-around past the ID Check Canopy. Due to the function of the building the public will not be allowed to enter the building so therefore the facility will not be required to be ABA/ADA compliant. Spaces occupied by guard personnel shall be ballistic rated. Roof requires ballistic rating only where direct fire threat is possible from an elevated position. The facility is not designed to be blast resistant. A break room that provides personal storage may replace, or be combined with, inside storage or replace outside storage depending on user requirements. Also consider the addition of a small break room, especially when the gatehouse is located in a remote area.

i. Command and Control function: Provide ballistic resistant walls, windows and exterior doors with front door locksets. Roof requires ballistic rating only where direct fire threat is possible from an elevated position.

ii. Toilet: Provide privacy lockset. Provide a base cabinet with the sink to house equipment such as a water heater and miscellaneous supplies, if desired by users. This is recommended to be accessible directly from the Command-and-Control Room only.

iii. Janitor’s Closet/Inside Storage: Provide standard utility space lockset. Provide a mop sink and mop holder with shelf.

iv. Mechanical/Electrical room: Provide entry doors with locksets (coordinated keying with installation groups responsible for maintenance and operation).

v. Outside Storage (Optional): Provide entry door with locksets.

vi. Communications room: Provide entry doors with locksets (coordinate keying with installation groups responsible for maintenance and operation).

N. Standalone Toilets

Toilets can be single units or twin single units combined in a single building. The toilets when required to be ABA/ADA accessible shall be handicapped accessible with grab bars, tilted handicapped mirrors, etc. All toilet accessories are to be mounted in accordance with ABA/ADA criteria. At OCONUS locations host nation accessibility criteria may be utilized in lieu of ABA/ADA requirements. If no host nation criteria exists, the project will comply with ABA/ADA. Provide privacy lockset. No ballistic or blast protection is required.

O. Standalone Storage

The Standalone Storage will house equipment used within the ID Check and Search Areas. Equipment may include traffic cones, and mirrors used in vehicle inspection. The building can be a prefabricated storage unit or stick built construction. The building can be located on an island under the ID Check Canopy if the required field of view is maintained. Provide utility lockset. No ballistic or blast protection is required.

P. Communications with Mechanical/ Electrical Equipment Building (Standalone Building)

The facility will house electrical and Communications equipment. The mechanical and electrical equipment area will house heating and cooling equipment for the building. The building will contain CCTV equipment racks, Duress, AVB, AIE, IDS and other electrical equipment necessary for the operation of the ACP.

i. Communications: Provide entry doors with locksets (coordinated keying with installation groups responsible for maintenance and operation). No ballistic or blast protection is required.

ii. Mechanical room: If required, provide entry doors with locksets (coordinate keying with installation groups responsible for maintenance and operation). No ballistic or blast protection is required.

iii. Electrical room: If required, provide entry doors with locksets (coordinate keying with installation groups responsible for maintenance and operation). No ballistic or blast protection is required.

Q. Pedestrian ID Check

Ballistic rated construction. Provide 360-degree field of view. Provide sliding ballistic rated doors and hardware. Provide a countertop. Countertop to have deal tray for passing identification cards. Provide a ballistic rated speaking portal. Roof requires ballistic rating only where direct fire threat is possible from an elevated position. If acting as a Pedestrian ID Check Entrapment area for a combined facility, see the desired facility combination example for additional information.

R. Overwatch Building

The Overwatch Building will be a pre-manufactured or stick built unit. Overwatch shall have a single door and a minimum of 24-inch-deep stainless-steel counter. Ballistic rated construction for walls and windows is required. Provide 360-degree field of view for the overwatch. Provide single ballistic rated door with

hardware. Gun ports to be provided on all sides of the building. If there is substantial thickness to walls, such as a CMU wainscot veneer, the gunports need to be increased in size to accommodate the maneuverability of the gun and the personnel for aiming. Roof requires ballistic rating only where direct fire threat is possible from an elevated position.

2.8.2. Examples of Combinations of Facilities

See Army Standard for guidance on square footage limits and additions regarding combining multiple functions/facilities into one facility. The following combinations are examples of functions that can be combined into one facility. Combinations that are not addressed may still be combined but are not typical.

A. Gatehouse with Small or Large Search Area Function

All interaction between Command and Control and non-ACP personnel shall include ballistic rated protection (e.g. Intercom, Pass Through Drawers, etc.). See the Architectural General Requirements for these two facilities/functions to combine into one facility. An example drawing is provided on the MSRI website for this combination.

B. Gatehouse with Visitor Control Center Function

All interaction between Command and Control and non-ACP personnel shall include ballistic rated protection (e.g. Intercom, Pass Through Drawers, etc.). See the Architectural General Requirements for these two facilities/functions to combine into one facility.

C. Visitor Control with Small or Large Search Area Function

See the Architectural General Requirements for these two facilities/functions to combine into one facility.

D. Gatehouse with Small or Large Search Area Function and Pedestrian ID Check

All interaction between Command and Control and non-ACP personnel shall include ballistic rated protection (e.g. Intercom, Pass Through Drawers, etc.). The Pedestrian ID Check will act as an entrapment area that will be controlled by the command-and-control personnel. Wall between the Pedestrian Entrapment Area and Command and Control function will be ballistic rated. Doors will have locksets and electric strikes. See the Architectural General Requirements for these three facilities/functions to combine into one facility.

E. Gatehouse with Pedestrian ID Check and Visitor Control Center

All interaction between Command and Control and non-ACP personnel shall include ballistic rated protection (e.g. Intercom, Pass Through Drawers, etc.). The Pedestrian ID Check will act as an entrapment area that will be controlled by the command-and-control personnel. Wall between the Pedestrian Entrapment Area and Command and Control function will be ballistic rated. Doors will have locksets and electric strikes. See the Architectural General Requirements for these three facilities/functions to combine into one facility.

F. Pedestrian Entrapment Area ID Check and Visitor Control Center

Ballistic resistant Pedestrian ID Check Entrapment Area can be pre-manufactured or stick built construction and will be installed on the end of the Visitor Control Center portion. See the Architectural General Requirements for these two facilities/functions to combine into one facility.

G. Overwatch Building with Command-and-Control Function

See the Architectural General Requirements for these two facilities/functions to combine into one facility. This building will be just one room for the Command-and-Control portion of the Gatehouse (excludes storage, toilet room, etc.) and overwatch room. This combined facility will require other facilities on the ACP area for access to toilets, communication, electrical, storage, and mechanical requirements. An example drawing is provided on the MSRI website for this combination.

2.8.3. Architectural Specialties

A. GENERAL

i. Where gypsum wallboard and acoustical tile ceilings are provided, provide recessed light fixtures.

ii. Kick plate: Provide a minimum height of 18” on all interior doors.

iii. Exterior Doors: Provide door hardware to limit weather, bugs, etc. from entering into the door when closed.

2.9. INTERIOR DESIGN REQUIREMENTS:

2.9.1. General Requirements

A. Interior Building Appearance: Provide the facility interior with a warm, comfortable, and professional environment through the appropriate use of building materials, finishes, fabrics, color and texture. Provide materials of high quality, functional, easily maintained, and furnished as described herein. Provide complementary building finishes and details. Finish and fabrics shall provide a completely integrated interior design. Coordinate the interior building appearance with the exterior building appearance.

B. Interior Design Categories: Interior Design is divided into two categories (1) Structural Interior Design (SID) and (2) Furniture, Fixtures and Equipment (FF&E). SID is the design of building related interior finishes and includes the selection and specification of interior materials and finishes for the building environment. Items typically considered a part of the building design include, but are not limited to interior building materials, floor, wall and ceiling finishes, built-in casework, millwork, fixed equipment, trim items, signage, window treatment, etc. Building related items are generally applied or fastened to the building. Furniture related interior design (FF&E) is the design of the interior furniture and includes the selection and specification of these items. Items typically considered part of the furniture package but are not limited to workstations, desks, seating, tables, storage units, trash receptacles, etc. Provide appropriate furniture finishes and fabrics for the intended use. Provide upholstery fabric (color, pattern, and fiber content) that is easily cleaned and helps hide soiling.

C. Two (2) Processor Visitor Control Center

i. Waiting and Processing:

a. Provide porcelain tile, rubber or epoxy floor finish and coordinate base material to match the floor finish.

b. Provide protective wallcovering minimum 36" h and maximum 4” h chair rail with painted gypsum wallboard above the protective wallcovering.

c. Provide chair rails along wall at location of seating at a minimum.

d. Provide painted gypsum wallboards for all other wall finish.

e. Include resilient corner guards on all exposed corners a minimum 48” h.

f. Provide solid surface material for window sills.

ii. Vestibule:

a. Provide walk-off mat in entire area.

iii. Toilet:

a. Provide porcelain tile, rubber or epoxy floor finish and coordinate base material to match the floor finish.

b. Provide full height porcelain tile on all walls.

iv. Break Room/Provost Marshal Room:

a. Provide porcelain tile, rubber or epoxy floor finish and coordinate base material to match the floor finish.

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b. Provided painted gypsum wallboard for the wall finish with protective wallcovering wainscot.

c. Provide plastic laminate or solid wood cabinetry.

d. Provide countertops and windowsills constructed of solid surface material.

e. Provide backsplash of solid surface or porcelain tile.

v. Mechanical/ Electrical room:

a. Provide sealed concrete for floor finish.

b. Provide resilient base for wall/floor trim.

c. Provide painted concrete masonry or gypsum wallboard.

vi. Communications room:

a. Provide sealed concrete for floor finish.

b. Provide resilient base for wall/ floor trim.

c. Provide painted concrete masonry or gypsum wallboard.

vii. Janitor's Closet:

a. Provide porcelain tile, rubber or epoxy floor finish and coordinate base material to match the floor finish.

b. Provide painted gypsum wallboard for the wall finish with FRP panels or porcelain tile on wet walls.

D. Three (3), (6), (9) Processor Visitor Control Center

i. Waiting Room:

a. Provide porcelain tile, rubber or epoxy floor finish and coordinate base material to match the floor finish.

b. Provide protective wallcovering minimum 36” h and maximum 4” h chair rail with painted gypsum wallboard above the protective wallcovering.

c. Provide chair rails along wall at location of seating at a minimum.

d. Provide painted gypsum wallboards for all other wall finish. Include resilient corner guards on all exposed corners a minimum 48” h.

e. Provide solid surface material for window sills.

ii. Processing Area:

a. Provide raised flooring with ramp access and, if feasible, stair access.

b. Provide carpet tile and resilient base finish.

c. Provide plastic laminate or solid wood casework with solid surface material countertops and backsplash.

iii. Vestibules:

a. Provide walk-off mat in entire area.

iv. Toilets:

a. Provide porcelain tile, rubber or epoxy floor finish and coordinate base material to match the floor finish.

b. Provide full height porcelain tile on all walls.

v. Break Room:

a. Provide porcelain tile, rubber or epoxy floor finish and coordinate base material to match the floor finish.

b. .

c. Provided painted gypsum wallboard for the wall finish with protective wallcovering wainscot.

d. Provide plastic laminate or solid wood cabinetry.

e. Provide countertops, and windowsills constructed of solid surface material.

f. Provide back splash of solid surface or porcelain tile.

vi. Office:

a. Provide carpet tile and resilient base finish.

b. Provided painted gypsum wallboard for the wall finish.

c. Provide solid surface material for windowsills.

vii. Provost Marshal Room:

a. Provide carpet tile and resilient base finish.

b. Provided painted gypsum wallboard for the wall finish.

c. Provide solid surface material for windowsills.

viii. Mechanical/ Electrical room:

a. Provide sealed concrete for floor finish.

b. Provide resilient base for wall/floor trim.

c. Provide painted concrete masonry or gypsum wallboard.

ix. Communications room:

a. Provide sealed concrete for floor finish.

b. Provide resilient base for wall/floor trim.

c. Provide painted concrete masonry or gypsum wallboard.

E. ID Check Canopy

i. N/A

F. Vehicle ID Check Guard Booth

i. Sealed concrete floor slab.

G. Search Function Bus Shelter

i. Sealed concrete floor slab.

ii. Benches can be metal or wood. Wood benches shall have manufacturer's approved sealant/preservative.

H. Small and Large Search Area Building(s)

i. Visitor Processor Area (Large Search Building Only):

a. Provide porcelain tile, rubber or epoxy floor finish and coordinate base material to match the floor finish.

b. Provide protective wallcovering minimum 36" h and maximum 4" h chair rail with painted gypsum wallboard above the protective wallcovering.

c. Provide chair rails along wall at location of seating.

d. Provide painted gypsum wallboards for all other wall finish.

e. Include resilient corner guards on all exposed corners a minimum 48" h.

f. Provide solid surface material on window sills.

ii. Corridor (Large Search Building Only):

a. Provide porcelain tile, rubber or epoxy floor finish and coordinate base material to match the floor finish.

b.

c. Provide protective wallcovering minimum 36" h and maximum 4" h chair rail with painted gypsum wallboard above the protective wallcovering.

d. Provide painted gypsum wallboards for all other wall finish. Include resilient corner guards on all exposed corners a minimum 48" h.

iii. Waiting Room/Office (Small Search Building) or Waiting Room (Large Search Building):

a. Provide porcelain tile, rubber or epoxy floor finish and coordinate base material to match the floor finish.

b. Provide protective wallcovering minimum 36" h and maximum 4" h chair rail with painted gypsum wallboard above the protective wallcovering.

c. Provide chair rails along wall at location of seating at a minimum.

d. Provide painted gypsum wallboards for all other wall finish. Include resilient corner guards on all exposed corners a minimum 48" h.

e. Provide solid surface material for windowsills.

iv. Office/Provost Marshal Room (Large Search Building Only):

a. Provide carpet tile and resilient base finish.

b. Provided painted gypsum wallboard for the wall finish.

c. Provide solid surface material for windowsills.

v. Break Room:

a. Provide porcelain tile, rubber or epoxy floor finish and coordinate base material to match the floor finish.

b. Provided painted gypsum wallboard for the wall finish with protective wallcovering wainscot.

c. Provide plastic laminate or solid wood cabinetry.

d. Provide countertops and windowsills constructed of solid surface material.

e. Provide back splash of solid surface or porcelain tile.

vi. Toilet:

a. Provide porcelain tile, rubber or epoxy floor finish and coordinate base material to match the floor finish.

vii. Janitor's Closet/Inside Storage:

a. Provide porcelain tile, rubber or epoxy floor finish and coordinate base material to match the floor finish.

b. Provide painted gypsum wallboard for the wall finish with FRP panels or porcelain tile on wet walls.

viii. Outside Storage:

a. Provide sealed concrete for floor finish.

b. Provide resilient base for wall/floor trim.

c. Walls shall be painted concrete masonry or gypsum wallboard.

ix. Mechanical/ Electrical room:

a. Provide sealed concrete for floor finish.

b. Provide resilient base for wall/floor trim.

c. Provide painted concrete masonry or gypsum wallboard.

x. Communications room:

a. Provide sealed concrete for floor finish.

b. Provide resilient base for wall/floor trim.

c. Provide painted concrete masonry or gypsum wallboard.

I. Truck Search Area Canopy

i. N/A

J. Passenger Vehicle Search Area Canopy

i. Vehicle Search Area

a. Provide sealed concrete for floor finish.

b. Provide resilient base for wall/floor trim.

K. Gatehouse

i. Command and Control:

a. Provide porcelain tile, rubber or epoxy floor finish and coordinate base material to match the floor finish.

b. Provide protective wallcovering minimum 36" h and maximum 4” h chair rail with painted gypsum wallboard above the protective wallcovering.

c. Provide chair rails along wall at location of seating at a minimum.

d. Provide painted gypsum wallboards for all other wall finish. Include resilient corner guards on all exposed corners a minimum 48” h.

e. Provide solid surface material for countertops, back splash and windowsills.

f. Provide a raised section of the ceiling in front of the front wall for the installation of CCTV monitors that place the monitor out of the line of sight of a person looking out the windows.

ii. Toilet:

a. Provide porcelain tile, rubber or epoxy floor finish and coordinate base material to match the floor finish.

b. Provide full height porcelain tile on all walls.

iii. Janitor’s Closet/Inside Storage:

a. Provide porcelain tile, rubber or epoxy floor finish and coordinate base material to match the floor finish.

b. Provide painted gypsum wallboard for the wall finish with FRP panels or porcelain tile on wet walls.

iv. Mechanical/ Electrical room:

a. Provide exposed sealed concrete for floor finish.

b. Provide resilient base for wall/floor trim.

c. Provide painted concrete masonry or gypsum wallboard.

v. Communications:

a. Provide exposed sealed concrete for floor finish.

b. Provide resilient base for wall/floor trim.

c. Provide painted concrete masonry or gypsum wallboard.

vi. Outside Storage (Optional):

a. Provide sealed concrete for floor finish.

b. Provide resilient base for wall/floor trim.

c. Provide painted concrete masonry or gypsum wallboard.

L. Standalone Toilets:

i. Provide porcelain tile, rubber or epoxy floor finish and coordinate base material to match the floor finish.

ii. Provide full height porcelain tile on all walls.

M. Standalone Storage

i. Provide sealed concrete for floor finish.

ii. Provide resilient base for wall/floor trim.

N. Communications with Mechanical/ Electrical Equipment Building (Standalone Building)

i. Provide sealed concrete for floor finish.

ii. Provide resilient base for wall/floor trim.

O. Pedestrian ID Check

i. Provide rubber flooring.

ii. Provide resilient base for wall/floor trim.

iii. Provide solid surface material for countertop and back splash.

P. Overwatch Building

i. Provide sealed concrete for floor finish.

ii. Provide resilient base for walfloor trim.

Q. (Example Combination Facilities, See drawings)

i. See information above

2.9.2. Interior Finishes

The following requirements include both functional and (example combinations of functional requirements), where identified. Any reference to installation criteria is to establish materials and finishes consistent with the installation's architectural theme.

A. MINIMUM FINISH REQUIREMENTS

i. Carpet Tile

a. Provide antistatic carpet with a pattern containing a minimum of 3 distinctly different colors or a bold multi-colored tweed for maximum soil-hiding properties. Carpet must be tile with 100% continuous filament, solution dyed and/or yarn dyed, branded nylon with loop construction. Provide synthetic primary and secondary backing materials that are customarily used and accepted by the trade for each type of carpet. Preference should be given to products containing recovered material when possible. Carpet must meet the following minimum requirement:

b. Minimum Pile Characteristics
Provide carpet with tufted construction, loop pile, minimum 1/8" gauge and minimum pile density of 4725. Provide carpet with a greater than or equal to 3.0 (Heavy) TARR traffic level classification in accordance with ASTM D7330 or CRI Test Method 103.

c. Static Control
Provide static control that is appropriate for the function of the room. Flammability and Critical Radiant Flux Requirements Carpet must comply with 16 CFR 1630 or ASTM D2859.

d. Tuft Bind
Comply with ASTM D1335 for tuft bind force required to pull a tuft or loop free from carpet backing with a minimum 8-pound average force for modular carpet tile.

ii. Porcelain Tile

a. Provide large format porcelain tile that conforms to ANSI A137.1, less than 0.5 percent water absorption and is a minimum commercial heavy traffic grade. Porcelain tile and trim shall be unglazed with the color extending uniformly through the body of the tile or glazed with body color consistent with glaze color. Color of porcelain tile and porcelain tile grout shall be a medium range color to help hide soiling.

iii. Rubber Flooring

a. Provide flooring that conforms to ASTM F1344 for tile, Class 1 homogeneous, Type B (through mottled). Conform to ASTM F1859 (flooring without backing). Provide textured surface.

iv. Epoxy Flooring:

a. Provide a clear two-component compatible system epoxy resin binder consisting of: (1) a liquid blend of a biphenyl-based epoxy resin and an aliphatic polyglyceride ether, and (2) a liquid blend of two modified amine curing agents, which individually cures the epoxy resin at room temperature to a glossy smooth film.

b. Provide aggregate recommended by the resinous flooring manufacturer and approved by the Contracting Officer. Deliver aggregate to the site in three separate package gradations for blending.

c. Provide nonambering aliphatic or aromatic moisture-curing polyurethane surface sealer into which has been incorporated a flatting agent. Add flatting agent not more than 24 hours prior to actual application of the coating. Ensure cured coating with flatting agent yields 60-degree specular gloss of 10 to 20 when tested in accordance with ASTM D523.

v. Walk Off Mat

a. Provide surface-mounted extruded aluminum frames that have a tapered flexible aluminum or vinyl edge at least 1 ½" wide and a frame depth that accommodates a mat. Provide roll up mat in frame with tread inserts consisting of carpet composed of solution-dyed nylon or polypropylene carpet fibers fusion-bonded to a rigid two-ply backing to prevent fraying and supplied in continuous splice-free lengths. Carpet to have antistatic and anti-stain treatments. Ensure that pile weight is a minimum 30 ounces per square yard.

vi. Resilient Base:

a. Provide rubber or vinyl base 4 inches high and minimum of 1/8 inch thick.

vii. Solid Surfacing Material

a. Solid surface material to be homogeneous filled solid polymer, not coated, laminated or of a composite construction, meet CSA B45.5-11/IAPMO Z124 requirements, and be composed of cast 100 percent acrylic or a formulation composed of acrylic and polyester polymers, mineral fillers, and pigments. Acrylic polymer content must not be less than 5 percent and not more than 10 percent. Color and pattern must go through the thickness of the material. Provide minimum of ½ inch-thick material for countertops and windowsills. Solid surfacing material shall have patterns that are mottled, flecked or speckled, except for sinks. Countertops at sinks shall be light to medium range in color to help hide water spotting and to reduce appearance of scratches.

viii. Plastic Laminate

a. Provide High Density Pressure Laminate (HDPL) that are patterned are mottled, flecked, speckled or wood grain; solid colors are not acceptable.

ix. Protective Wall Covering

a. Provide wall covering/panels consisting of high impact rigid acrylic vinyl or polyvinyl chloride resilient material. Provide panel sizes of 3 x 8 or 4 x 8 feet and a minimum .060" thick. Minimum impact resistance must be 18 ft-lbs./sq. inch when tested in accordance with ASTM D256 (Izod impact, ft-lbs. per sq inch notched). Fire rating must be Class 1 when tested in accordance with ASTM E84 having a maximum flame spread of 25 and a smoke developed rating of 450 or

less. Material must be rated self-extinguishing when tested in accordance with ASTM D635. Finish top edge and seams of wallcovering/panels.

x. Corner Guards

a. Provide resilient corner guards a minimum 48 " h. Product must be fabricated of 16-gauge thick material and wings shall be minimum 1 ½" wide.

xi. Miscellaneous Items

a. Provide finish colors of fire extinguisher cabinets, receptacle bodies and plates, fire alarms/warning lights, emergency lighting, and other miscellaneous items must be coordinated with the building interior design. Match color of equipment items on ceilings (speakers, smoke detectors, grills, etc.) with the ceiling color.

2.9.3. Interior Specialties

A. Signage: Provide a complete interior signage system that coordinates with the interior design. The facility interior signage system shall be standardized throughout the building and shall be flexible to allow for the addition and deletion of signs and information.

B. Room signs for spaces in which the room name, function of the room, or personnel within a room may change shall have a changeable paper insert that can be changed by the User in the future. Provide rooms signs where appropriate.

C. Window Treatment: Provide commercial grade horizontal blinds for exterior windows with the exception of functions that required visibility (i.e. guard booth). Slats must be aluminum not less than .0070 thick.

2.9.4. FF&E (Furniture Fixtures & Equipment)

A. Furnishings

GENERAL:

Conceal clips, screws and other furniture construction elements where possible. Seating upholstery is required to meet Wyzenbeek Abrasion Test; 50,000 minimum double rubs. Furniture can be wood (where appropriate), plastic laminate or metal finish. Tops for case goods with plastic laminate or metal construction are to be plastic laminate. Location, use and frequency of moving furniture are to be considered when determining appropriate finish material and construction. Furniture constructed of particleboard with plastic laminate finish is not acceptable. Provide box and file drawers with a heavy-duty suspension system. Construct furniture with concealed fasteners. Furniture storage is to be lockable with keys provided to the user. Locks shall be keyed per user requirements. Coordinate style details and finishes within a room. Refer to the drawings for furniture layout. Trash receptacles shall be provided in all employee workspaces, waiting rooms and by copier and printers.

i. Task Chair: Provide ergonomic task chair that is rated for 24/7 use, minimum weight capacity 300 lbs., without arms, upholstered or mesh seat and back, back tilt and locking capability, pneumatic seat height adjustment, adjustable lumbar support, seat depth adjustment, five-star base and casters. Provide desk chairs with adjustable seat height range of 4 ½", range to include 16 1/2 – 20". (Exception private offices to have a task chair with arms).

ii. High Stool: Provide ergonomic swivel stool that is rated for 24/7 use, minimum weight capacity 300lbs, without arms, upholstered or mesh seat and back, variable back lock, pneumatic seat height adjustment, adjustable lumbar support, seat depth adjustment, five-

star base, foot ring and casters. Provide high stools with adjustable seat height range of 5 ½" to include 20-25 ½".

iii. Guest/Waiting Chair: Provide guest chairs without arms, upholstered cushioned seat and back that are compatible in style, finish and color with the desk chairs (approximately 1'-9 w x 1'-11" d x 2'-6"h in size).

iv. Nursing Mother's Room Chair & Table: See guidance in para 2.4.10.B

v. Break Room Chairs: Provide break room chairs without arms, that are easily cleaned. Verify style and finishes with user.

vi. Break Room Table: Provide table with high pressure laminate top with PVC, vinyl, or post formed high pressure plastic laminate edge. A high-pressure laminate plastic laminate self-edge is not acceptable.

vii. Waiting Room Table: Provide end table with high pressure plastic laminate top, metal or wood frames that are compatible in style, finish and color to waiting chairs.

viii. U-Shape Workstations: Provide U-shaped workstation with keyboard tray, overhead storage, tackboard and task light, under all overhead storage. The unit is to have modesty panels that allow access to the wall for power and communications including two pedestals and a pencil drawer. Provide a personal tower with coat storage, shelves, and file storage where possible. Provide desk of steel construction with high pressure plastic laminate work surface. Tops are to have a formed edge such as PVC, vinyl molding or post formed high pressured plastic laminate. A high-pressure plastic laminate self-edge is not acceptable. Provide knee space that is not obstructed by legs/storage units that interfere with knee space of seated person. Provide adjustable height worksurface with wire management.

ix. L-shaped Workstations: Provide electric height adjustable desk with wire management, return, pedestal storage, wardrobe, tackboard, task light, steel construction with high pressure laminate worksurfaces and PVC edge banding to match the worksurface

x. Lateral File Cabinet: Provide four drawer lateral file, unless limited by window design or other architectural features. File drawers are to be full extension, accommodate letter files and have rails for hanging folders. The drawers are to be capable of hanging files side-to-side and front-to-back. Drawer pulls are to be an integral pull, not an attached pull. Counterweights are to be provided when required by the manufacturer for stability.

xi. Bookcase: Provide four shelf metal bookcase(s) with adjustable shelves. Shelves are to be of sufficient height and depth to accommodate standard three ring binders. Bookcases can be inter-changed with lateral file cabinets, depending on user requirements or preferences.

xii. Supply Cabinet: Provide metal double door lockable supply cabinet with adjustable shelves.

xiii. Anti-Fatigue Mat: Provide an appropriate sized anti-fatigue mat.

xiv. Trash Receptacles: Provide rubber trash receptacles approximately 14" w x 11" d x 15" h.

xv. Recycling Center: Provide recycle center with four separate containers fastened together, decals and corresponding top opening for trash, paper recycling, plastic recycling and aluminum recycling. Provide 23-gallon capacity for each container, polyethylene liner included with hinged door for easy access to empty liners steel construction with powder

coated finish and adjustable foot glides. (Provide larger bins for larger buildings and smaller bins for smaller buildings).

2.10. STRUCTURAL REQUIREMENTS:

2.10.1. General

Structural design of all Access Control buildings shall be governed by the International Code Council publication, International Building Code (IBC), as modified by DoD Unified Facilities Criteria document, UFC 3-301-01, "Structural Engineering". The most current edition of UFC 3-301-01 shall apply, and the applicable edition of IBC shall be as identified in the UFC.

2.10.2. Loadings

Structural loadings for building designs shall be determined in accordance with the IBC, and, by reference, American Society of Civil Engineers publication, ASCE 7, using applicable occupancy data and climatic/seismic data tabulated in UFC 3-301-01 "Structural Engineering" for the location of the facility on which the Access Control structures are being constructed, unless specific design parameters are provided by the facility.

2.10.3. Seismic Design

Seismic design of buildings shall be in accordance with the IBC, except as modified by UFC 3-301-01, "Structural Engineering".

2.10.4. Ballistic Resistant Design

Facility buildings identified in the Architectural criteria as "ballistic resistant" shall be designed in accordance with the provisions of UFC 4-023-07, "Design to Resist Direct Fire Weapons Effects", in addition to the criteria identified in the Architectural design narrative.

2.10.5. Antiterrorism Design

ACP structures shall be sited, designed and constructed in accordance with the minimum requirements of UFC 4-010-01, "DoD Minimum Antiterrorism Standards for Buildings", unless a higher level of protection is mandated by local threat assessment and/or policy. Facilities which are, by occupancy, considered "inhabited structures", per the criteria, which cannot be sited to meet conventional construction standoff distance requirements from threats, shall be designed as hardened facilities. Hardened structures shall have walls, roof slabs, doors and windows designed and/or specified to resist blast pressures associated with the actual threat standoff distance per UFC 4-010-01.

Where prestressed concrete roof systems are used to support gravity loads for ACP structures that are required by the UFC to be designed to be hardened against blast threats, conventional reinforcement shall be provided in roof toppings and/or on the exterior side of prestressed members, designed to provide adequate reinforced resistance to the combined reverse flexural effects of the blast pressure dynamic elastic rebound member moments and the existing upward prestress member moments, where they exceed the resisting minimum dead load.

2.10.6. Canopies

A. Wind Loading

Vehicle canopies shall be considered as "open structures" with "clear wind flow" for calculation of wind pressures on roofs for main wind force resisting systems and component and cladding wind pressures in accordance with the UFC referenced edition of ASCE 7. Canopies shall be considered flexible structures,

having a Gust Effect Factor, “G”, of not less than 0.90, in accordance with ASCE 7, to account for flexibility of the building system. Canopy wind for the design of frames or columns shall include the summation of pressures on the various canopy elements having a projected area perpendicular to the wind direction under consideration. Projected areas include front and rear surfaces of both windward and leeward canopy fascias or other vertical roof structure surfaces, windward surfaces of all columns, and lateral components of wind on sloped roofs, in accordance with ASCE 7. Canopy fascias shall be considered as either inverted “parapets” or “solid freestanding signs”, in accordance with ASCE 7, depending upon their configuration. Wind pressure on columns shall be computed as for “open signs and/or lattice frameworks”, and shall be applied to all free-standing columns simultaneously, rather than just to the windward facing perimeter columns. Main wind force resisting system overall lateral wind forces from the roof, fascias and columns shall be applied in each (+/-) direction along the principal building axes as separate loading conditions, and as another set of load conditions, shall be applied coincident with a torsional moment equal to the sum of wind forces multiplied by a +/- eccentricity of 15% of the windward roof plan width dimension. Wind shall also be considered at 75% of the full pressure from additive orthogonal axis directions applied simultaneously (representing oblique wind directions).

B. Lateral Force Resisting System

Canopies shall have a rigid frame and/or cantilever column lateral force resisting structural system. Lateral forces shall be transferred to columns and frames by horizontally spanning spandrel members, structural diaphragms or horizontal bracing systems in the plane of the roof. The metal roof panels and liners shall not be used as a structural diaphragm unless analysis calculations in accordance with the provisions of the Steel Deck Institute (SDI), demonstrating the adequacy of the strength and stiffness of the panels and anchorage system, are performed. Roof and fascia panels shall similarly not be considered to provide lateral bracing for roof beams and purlins. Roof and liner panels shall be anchored to purlins or other framing members with screws or bolts. Clamp systems shall not be used to attach panels to the structure.

C. Column Anchorage and Foundations

Canopy column base anchorages shall be designed for combined shear, moment and uplift, as applicable, in accordance with the UFC referenced edition of American Concrete Institute code ACI 318, Chapter 17. Canopy foundations shall be designed to resist factored wind uplift and overturning. Soil bearing pressures shall be investigated for all loading conditions, including overturning.

2.11. THERMAL PERFORMANCE

[For RFP Wizard revise paragraph title to read: “SEE PART 3.7 THERMAL PERFORMANCE – NOT USED”]

[ACP Standard:

Thermal insulation must comply with the minimum requirements of ASHRAE Standard 189.1-2009.]

2.12. PLUMBING REQUIREMENTS:

OCONUS: All construction outside of the United States is also governed by Status of Forces Agreements (SOFA), Host Nation Funded Construction Agreements (NNFA), and in some instances, bilateral Infrastructure Agreements (BIA). Therefore, the acquisition team must ensure compliance with the most stringent of any UFC applicable, the SOFA, the HNFA, and the BIA, as applicable.

2.12.1. Sanitary Sewer (where connection is possible)

A. Search Area Building and Search function

For Large and Small Army Standard Design or Custom Types Search Area Buildings, and search functions or rooms of combined facilities as shown on [Center of Standardization (COS) drawings] [RFP Wizard Appendix B – Drawings]; domestic cold and hot water are to be provided to all plumbing fixtures as required by code. A sink and garbage disposal is to be provided for the break room. Condensate drains from mechanical equipment are to be routed to a floor drain. Provide a sanitary drainage system as required by code.

B. Visitor Control Center & (Facilities including Visitor's Processing)

Domestic cold and hot water are to be provided to all plumbing fixtures as required by code. A sink and garbage disposal are to be provided for the break room. Condensate drains from mechanical equipment are to be routed to a floor drain. Provide a sanitary drainage and vent system as required by code.

C. Facilities including Command and Control function

Domestic cold and hot water are to be provided to all plumbing fixtures as required by code. A sink and garbage disposal are to be provided for the break room. Condensate drains from mechanical equipment are to be routed to a floor drain. Provide a sanitary drainage and vent system as required by code.

D. ID Check Guard Booth and Pedestrian ID Check or (Pedestrian ID Check "room" function)

No domestic cold and hot water are to be provided and no drainage and vent system.

E. Overwatch Building

No domestic cold and hot water are to be provided and no drainage and vent system.

2.12.2. Sanitary Sewer (where connections are not possible)

Design criteria for septic tanks, waterless toilets (composting toilet, incineration toilet, chemical toilet) and mounding systems shall be in accordance with UFC 3-240-02, "Domestic Wastewater Treatment".

2.12.3. Drinking Water

Drinking fountains are not required for an occupant load of 15 or fewer. See Center of Standardization (COS) furniture layout drawings for occupant count.

2.12.4. Sizing

OCONUS: All construction outside of the United States is also governed by Status of Forces Agreements (SOFA), Host Nation Funded Construction Agreements (NNFA), and in some instances, bilateral Infrastructure Agreements (BIA). Ensure compliance with the most stringent of any UFC applicable, the SOFA, the HNFA, and the BIA, as applicable.

A. STANDARDS AND CODES: The plumbing system and water consuming equipment shall conform to APPLICABLE CRITERIA and ASHRAE Standard 189.1, Section 6.3, Mandatory Provisions, and either Section 6.4, Prescriptive Option, or Section 6.5, Performance Option. In addition, meet the requirements of ASHRAE Standard 189.1, Section 10.3.2. Exception: Paragraph 6.3.2.3. (c) Shall not be required to be provided.

B. HOT WATER SYSTEMS: For hot water heating and supply systems, meet the requirements in UFC 3-420-01 "Plumbing Systems" and amendments, and the service water heating requirements of ASHRAE 189.1.

C. SIZING HOT WATER SYSTEMS: Design in accordance with ASHRAE Handbook HVAC Applications, Chapter 49, “Service Water Heating,” UFC 3-420-01 and amendments, and ASHRAE 189.1, Section 7.4.4. Size and place equipment so that it is easily accessible and removable for repair or replacement.

D. WATER EFFICIENT PLUMBING FIXTURES: Indoor plumbing fixture equipment shall comply with the following criteria: ASHRAE 189.1, Section 6.3, Mandatory Provisions, and either Section 6.4, Prescriptive Option, or Section 6.5, Performance Option.

E. DRAINAGE SYSTEMS: Do not use engineered vent or Sovent® type drainage systems.

2.13. COMMUNICATIONS AND SECURITY SYSTEMS:

2.13.1. Communication

A. Communication system shall be installed in accordance with the Technical Guide for Installation Information Infrastructure Architecture (I3A) for exterior telecommunications work and use UFC 3-580-01 for interior telecommunications.

B. Command and Control, ID Check Guard Booth, Pedestrian ID Check, Search Area(s), Search Facilities, except Search Shelter, Overwatch Position, Overwatch Facility, and Visitor Control Center shall have a minimum of two (2) means of communication from the facility and, when present, the Central Security Monitoring Station.

C. Communication Handhole. Provide a communication handhole in each island/median in the ID Check Area. Conduit shall be run from the handhole to the island/median guard booth and to the next island/median handhole. This handhole/conduit system shall be used for all communication (copper and fiber) to the ID Check guard booths and to the area. The handhole cover is to be flush with the island/median.

2.13.2. Information Connectivity

A. Information Connectivity and LAN systems shall be installed in accordance with the Technical Guide for Installation Information Infrastructure Architecture (I3A) for exterior telecommunications and UFC 3-580-01 for interior telecommunications.

B. Command and Control, ID Check Guard Booth, Pedestrian ID Check, Search Facilities, Overwatch Facility, and Visitor Control Center shall have information connectivity to the LAN system and internet.

2.13.3. Closed Circuit Television (CCTV)

A. The ACP shall have a CCTV system installed.

B. CCTV cameras shall have sufficient resolution and wide dynamic range for real time assessment of activity detail.

C. Overwatch Cameras. CCTV cameras shall over watch the Approach Zone, ID Check Area, Search Area(s), and Active Vehicle Barrier area(s). Camera view at the active vehicle barriers shall include the nonsecure side of all active vehicle barriers as well as any traffic signals facing toward the nonsecure side. Camera view at the active vehicle barriers shall include a view of the secure side of outbound lane active vehicle barrier(s) and traffic signal.

D. ID Check Area. CCTV cameras shall be positioned to view drivers, ID Check guards, rear license plate, and the vehicle in the ID check lane.

E. Search Area(s) including Enclosed Search Facility. CCTV cameras shall be positioned to view drivers, Search guards, rear license plate, and the vehicle being searched.

F. Rear License Plates. Conduit shall be installed in the islands at the Search Areas and ID Check Area to accommodate future cameras to view rear license plates. Coordinate with the requirements given in the paragraph on Automated Installation Entry (AIE). Installations that will receive fixed AIE do not need an additional rear license plate camera for the ID Check Area, since there will be one that is part of the fixed AIE install package.

G. ID Verification. CCTV cameras are to be positioned to view visitors at pass and identification stations. These stations area located in the Visitor Control Centers. Command & Control does not have to be able to view the Visitor Control Center interior view. Search Offices may have an interior identification station, which would need a CCTV camera to view the visitor.

H. All cameras are intended to be fixed view except for the ID Check Area and Search Area overwatch cameras are allowed to be pan/tilt/zoom. The active vehicle barrier area cameras are to be fixed in order to ensure the proper view are always maintained.

I. Monitors. Monitors for CCTV shall be at the Command-and-Control location and the Central Security Monitoring Station as a minimum.

J. Digital Video Recording. The CCTV system shall include digital video recording for all ACP video cameras. The video recording shall operate 24 hours per day and seven (7) days a week and shall retain all imagery for a minimum of seven (7) days.

K. Pedestrian ACPs:

i. Overwatch Cameras. CCTV cameras shall over watch the approach to the booth from the entry gate to the area around the active pedestrian barrier including the booth.

ii. Monitors. Monitors for CCTV shall be at the Pedestrian ID Check. Monitors shall also be located at Command and Control and Central Security Monitoring, if part of a vehicle ACP. If not part of a vehicle ACP, then provide monitoring at the Central Security Monitoring Station.

iii. Digital Video Recording. The CCTV system shall include digital video recording for all ACP video cameras. The video recording shall operate 24 hours per day and seven (7) days a week and shall retain all imagery for a minimum of seven (7) days. Video recordings shall have the ability to be saved to external media for retention greater than seven (7) days.

2.13.4. Electronic Security

A. Duress Alarms. Guards at the ID Check Area Guard booth, Pedestrian Booth, Search Area(s) including Enclosed Search Facilities, Overwatch Facility, Overwatch Position, and Visitor Control Center shall have duress alarm capability that shall annunciate at both the Command-and-Control location and the Central Security Monitoring Station, when available. The Visitor Control Center shall ensure each Pass & ID station, as a minimum, have a means of duress.

i. Duress buttons shall be protected and not prone to accidental activation.

ii. Duress buttons shall be located within close proximity to all routinely manned positions.

iii. Duress button shall not be visible to the general public.

iv. Telephone shall not be considered a duress device in their normal configuration.

v. If there isn't a Central Monitoring Station, then annunciate at an alternate security force station or monitoring location.

vi. Wireless Duress Buttons. If wireless duress buttons are utilized in conjunction with mandatory hardwire buttons, then the wireless device shall have battery level monitoring, low battery level visible and audible warning, demonstrated transmission capacity of 150 feet greater than all usage locations, transmit of radio frequencies that do not interfere with or are impeded by any local wireless apparatus, and transmit in a spread spectrum mode.

B. Intrusion Detection. Exterior doors to the Command and Control, Gatehouse, Guard Booths, Overwatch, Search Office, Enclosed Search Facility, and Visitors Control Center shall be equipped with Balanced Magnetic Switches (BMS) for intrusion detection. Storage rooms that do not contain any security, CCTV or Communication equipment are not required to have BMS. Interior doors that go to rooms that contain Communication or security equipment shall be equipped with BMS.

C. Tamper Switches.

i. Electronic control cabinets for Communications, AIE, CCTV, and security controls shall be equipped with tamper switches. CCTV and security controllers shall be in cabinets or panels.

ii. Active vehicle barrier cabinets shall be equipped with tamper switches. Active vehicle barrier controllers shall be in cabinets or panels. Control panels associated with the AVB controls (master, guard booth, local, etc.) are required to be equipped with tamper switches.

iii. The cabinet at the Overwatch Position pad (if provided) shall be equipped with a tamper switch(es).

iv. Manholes and handholes that will contain duress alarm, AIE, CCTV, intrusion detection or AVB control wiring and there are splices present are to have tamper switches provided on the covers.

v. Uninterruptable power supply (UPS) cabinets shall be equipped with tamper switches.

2.13.5. Automation

A. Infrastructure to include the conduit pathways and space in facilities for Automated Installation Entry (AIE) per the latest requirements by PM-PFS and the requirements in this document shall be provided. AIE is not currently required in foreign countries. AIE includes a fixed pedestal card reader or a handheld card reader. Each system has different requirements.

i. Fixed AIE includes a rear license plate camera, a driver face camera, traffic arm with signal, and a card reader that is located on each ID Check Area Island.

ii. Fixed AIE includes equipment that is provided in each ID Check Area guard booth that monitors the camera views and the card reader.

iii. Fixed and Hand-Held AIE head end equipment is located in the communications room and is to be in a cabinet.

iv. Fixed and Hand-Held AIE require an antenna that is normally located at the ID Check Island.

B. Automation equipment other than AIE may be required. Provide infrastructure to include the conduit pathways, power, and space for this equipment.

2.13.6. Active Vehicle Barrier Control System

Each ACP shall be furnished with an Active Vehicle Barrier Control System (AVBCS). The AVBCS shall be an integrated control system and be include part or all of the following subsystems: active vehicle barriers, active vehicle barrier controls, traffic signals, traffic signal controls, traffic signs, pavement markings, traffic warning signs, traffic arms, vehicle overspeed detection & alarm, vehicle wrong-way detection & alarm., intrusion detection/duress alarm, CCTV, sequence event recorder (data logger), data transmission, other audible and visual alarms and all interconnecting wiring. The active vehicle barrier control system (AVBCS) shall collect alarm, status, and control sensor inputs at the ACP and provide control signals to the active vehicle barriers (AVB), traffic signals, traffic arms (when present), barrier lights, in roadway lights, and warning beacons. The AVBCS shall provide alarm, status, and control information to the Command and Control 'control console', each Guard Booth Control Panel, the Overwatch Position or Booth Control Panel, the Local Control Panel(s) at each AVB, Search Area Control Panel, Pedestrian Booth control panel, the CCTV subsystem for controlling camera presets, the duress alarm subsystem for controlling camera presets, and to the Installation's Central Security Monitoring System (CSMS)for annunciating alarms at both the CSMS alarm monitoring point and a CSMS provided annunciation panel at the Gatehouse.

A. Locations that do not have a CSMS shall have the alarms annunciate at the equivalent location.

B. CCTV and duress alarm subsystems may not be present when the AVBCS is installed. If that is the case, the AVBCS shall be provided with the necessary spare capacity for later installation.

C. The ACPCS system must utilize components and software that are intended for use in industrial or commercial control systems. The ACP control system shall not be a general-purpose computer or personal computer and shall not be consumer grade software.

D. Emergency-Fast-Operate (EFO), when required by the safety scheme, shall ensure the AVB closes in two (2) seconds or less.

E. Only guards in the Command and Control, ID Check Guard Booths, Search Areas, Pedestrian Booth, and Overwatch Position are required to have emergency fast operate close control of the active barriers. A master “Emergency-Fast- Operate” (EFO) button/switch shall be provided on a Barrier Master Control Panel located in Command and Control. Remote EFO buttons shall be located in each ID Check Guard Booth, Search Area, Pedestrian Booth, and the Overwatch Position. The “Emergency-Fast-Operate” buttons will close all active barriers in all inbound and outbound lanes, that are in EFO mode, simultaneously. Only those safety schemes that require an EFO have to comply with this requirement.

F. Command and Control, Guard Booths, Search Areas and Overwatch position shall have an enunciator providing audible and visual indication of alarms including over speed and wrong way.

G. Command and Control and the Overwatch position shall have an enunciator providing audible and visual indication of duress alarm.

H. Switches and indicating lights shall be provided on the AVB Master Control Panel to allow the Command-and-Control guard to individually enable or disable the remote EFO buttons.

I. Switches and indicating lights shall be provided on the AVB Master Control Panel to allow the Command-and-Control guard to individually open and close the active vehicle barriers.

J. Switches and indicating lights shall be provided on the AVB Local Control Panel to allow maintenance personnel to individually open and close the active vehicle barriers.

K. Installation shall maintain strict key control to ensure the EFO Reset, and the Test and Local modes are only operated when allowed by the head of the guards at that ACP.

L. See Access Control Point Standard drawing set for information on panel layouts and operation.

M. See UFGS 34 71 13.19, Appendix A for the appropriate SDDCTEA safety scheme and description on controls. Safety schemes that are not in Appendix A but have been approved by SDDCTEA are allowed. Description on the sequence of operation and operating panel layouts will be provided upon request.

N. Active Vehicle Barrier and In Roadway Lighting:

i. Active vehicle red delineation lighting is required to make barriers clearly visible when deployed, unless vehicle barriers are behind closed gates or the specific vehicle barriers are used to close service drives. Active vehicle barriers shall include red flashing lights facing the direction of the threat vehicle as a minimum. Required red lighting is dependent on the type of system required as listed below:

a. Bollard Systems – Include, as a minimum, one red light per bollard.

b. Plate Barriers Systems, 3 feet or greater in width – Include, as a minimum, 3 red lights with one mounted within 1 foot of each barrier edge and one mounted within 1 foot of the barrier centerline.

c. Plate Barrier Systems less than 3 feet in width – Include, as a minimum, one red light mounted within 1 foot of the barrier centerline.

d. Crash Barrier Systems – Include as a minimum, 3 red lights with one light mounted within 2 feet of each edge of the driving surface and one light mounted within 1 foot of the center of each lane spanned by the barrier.

e. Net Type Barrier Systems – No light is required to be mounted on this barrier type system, but mitigation (e.g. in-roadway lighting) must be provided.

ii. In-Roadway lighting is required where the AVB does not have all the required lighting on the AVB itself. Then hard-wired in-pavement lights are to be provided.

a. Provide red non-flashing roadway lighting in the pavement, with a minimum of 3 lights per lane per side. Luminaires shall have a sustained illumination level of 500,000 candela per square meter using the 10-degree refractor option at a distance of 30 feet.

b. Luminaire shall be rated for vehicular traffic and shall be manufactured for use in roadways.

c. Luminaire shall be unidirectional with a wide distribution pattern.

d. The luminaire shall not extend more than 0.5 inches above the road surface and shall have a smooth transition from the road surface.

e. In areas with snow, the luminaire shall be rated to handle snowplows. Select a product that has proven performance and will not be forced above the pavement surface by freeze/thaw cycles.

iii. Active Vehicle Barrier Markings/Finishes

Active vehicle barriers include retro-reflective material that is visible on both sides of the barrier when deployed. The markings/finishes are to comply with SDDTTEA Pamphlet 55-15 and MUTCD.

O. Guard booths. Provide a number on the exterior of each guard booth that is visible from Command and Control. The number will correspond with the Guard booth number used on the Master Control Panel for the barrier controls. Numbering shall be approved by the installation. Numbering shall be at least 6 inches high.

P. Overspeed detection, when required, shall be located to ensure the overspeed zone or zones are covered to ensure threat vehicle detection. Overspeed detectors are allowed to be several different types per UFGS 34 71 13.19 ACPCS; however, local weather conditions and topology requirements shall be taken into account. When overspeed detection is required, judicious use is required to prevent nuisance alarms associated with having set-points too low for the traffic flow. Set-points need to be sufficiently high over the posted speed to prevent nuisance alarms. Note that some installation will have posted speeds below 25 mph; however, set-points should still be set based on an assumed posted speed of at least 25 mph in order to limit nuisance alarms. Where overspeed detection settings of less than 30mph are utilized, the zone shall not extend more than 75 feet forward (toward the approach zone) when measured from the centerline of the ID Check guard booth. Such zones must utilize equipment that allows absolute cutoff at the 75 feet (or shorter) distance and will not utilize alarm settings lower than 25mph. Where possible, use 35mph as a minimum alarm setpoint for overspeed detection systems.

Q. Wrong-way detection shall be located to ensure that a vehicle that has not been cleared to proceed and try to use the outbound lane(s) to gain entry is detected. Wrong-way detectors are allowed to be several different types per UFGS 34 71 13.19 ACPCS; however, local weather conditions and topology requirements shall be taken into account. Wrong-way detection shall be located to ensure that rejected vehicles and other vehicles do not cause a nuisance alarm by traversing the in-bound and out-bound lanes.

R. Remotely Manned Egress Only Vehicle ACPs shall utilize the High Efficiency Presence Detection SDDCTEA safety scheme with the AVB being operated in the normally deployed position. The master control panel will be located at the remote manning location and will also provide the remote guard an option to lock the AVB in the deployed position. The remotely manned ACP is not intended to operate at FPCON levels in excess of Bravo+. If ACP operations are anticipated at higher FPCON levels on-site master control panel may also be necessary.

2.13.7. Cable Television (CATV)

Provide CATV in those facilities requested by the installation.

2.13.8. General Requirements

A. Exterior Wiring. Direct buried wiring is not allowed. All wiring shall be in conduit and shall be concrete encased. Exterior communication shall meet the requirements of I3A Technical Criteria for the Installation Information Infrastructure Architecture.

B. Signal System Handhole. Provide a signal system handhole in each island/median in the ID Check Area. Conduit shall be run from the handhole to the island/median guard booth and to the next island/median handhole. This handhole/conduit system shall be used for all signal systems (CCTV, IDS, Duress, AIE, AVB controls) to the ID Check guard booths and to the area. The handhole cover is to be flush with the island/median. A single handhole that handles both the signal and communication cables is allowed.

2.14. ELECTRICAL REQUIREMENTS:

2.14.1. Exterior Lighting

A. Visitor Control Center parking lot, sidewalks and other parking are to comply with the lighting requirements in UFC 3-530-01 “Design: Interior and Exterior Lighting and Controls”.

B. Lighting for the Pedestrian ACP shall maintain a minimum of two (2) Foot-Candles maintained illumination with an average to minimum ratio of 3:1 as measured at an elevation of 6 inches above the roadway surface. This includes areas of a vehicle ACP used for pedestrian access.

C. Access Control Point Corridor Lighting:

i. Approach Zone Roadway(s) are to have three (3) Foot-candles (FC) average maintained with an average to minimum ratio not to exceed 4:1 as measured at an elevation of 6 inches above the roadway surface. Lighting color rendering index (CRI) are to be not less than 50.

ii. Access Control Zone, ID Check Area and Search Area(s) are to have five (5) foot-candles (FC) average maintained with an average to minimum ratio not to exceed 3:1 as measured at an elevation of 6 inches above the roadway surface. In addition, where ID checks or searches are made, the illumination shall be 10 FC or twice the illumination in the immediate or surrounding area, whichever is greater. The vertical illumination shall be at least 25% of the horizontal illumination. ID Check Area and Search Areas shall have a color rendering index (CRI) of not less than 65. All other areas shall have a CRI of not less than 50.

iii. Response Zone Roadway(s) are to have three (3) Foot-candles (FC) average maintained with an average to minimum ratio not to exceed 4:1 as measured at an elevation of 6 inches above the roadway surface. Lighting shall have a CRI of not less than 50.

iv. The ACP corridor (Approach, Access Control and Response Zones) cannot have poles shorter than 15 feet. In situations where poles would need to be shorter to provide the lighting, then the COS is to be contacted. A proposed solution is required to be approved by the Surface Deployment and Distribution Command Transportation Agency (SDDCTEA) in order to ensure all aspects of motorist safety is maintained. The option to not provide lighting throughout the entire ACP Corridor will have to be justified in writing as to why there isn’t a workable solution.

v. ACP layouts will vary greatly, which will have an impact on the length of the Approach, Access Control and Response Zones. Situations where the zone length is too short to have sufficient transitional lighting will be taken on a case-by-case basis. Approval will be by the COS with consultation with SDDCTEA to ensure traffic safety is maintained. This may mean on a short Approach zone that it may be deemed better to have the appropriate transition lighting over having the full foot-candle level average immediately at the start of the ACP.

D. Color Rendering Index (CRI). Lighting at the ID Check Area, Access Control Zone, and Search Areas shall have a color rendition index (CRI) of not less than 65. All other light sources shall have a CRI of not less than 50.

E. Light Loss Factor (LLF).The design is to take into account a light loss factor for the life of the luminaires. The LLF is to be calculated in accordance with Illuminating Engineering Society of North American handbook. This includes using lamp depreciation factor (for LEDs this would include the driver and the luminaire) and the dirt depreciation factor. Instead of providing the

LLF calculation, a LLF of 0.75 can be used. The LLF can be adjusted, if the installation indicates that there is a relamping plan in place to replace all the luminaires after a specified time. In no case is a LLF used to be higher than 0.85.

F. Transition Lighting. Transition lighting shall be provided in accordance with UFC-3-530-01 “Design: Interior and Exterior Lighting and Controls”, SDDCTEA Pamphlet 55-15 “Traffic and Safety Engineering for Better Entry Control for Facilities”, and IES Handbook of North America. Transition lighting goes from the lower light levels prior to the Approach Zone up to the required light level for the Approach Zone and then again up to the required level for the Access Control Zone. Then the lighting will transition from the Access Control Zone to the lower level for the Response Zone. Then after the active vehicle barriers the light level needs to transition down to the lower light level for the street. Roadway geometry may impact the ability to do the transition lighting per the criteria; however, the best engineering attempt shall be accomplished.

G. Power Requirements. High intensity discharge luminaires indicated to be on generator back-up power shall have quartz-restrike provided when the luminaire is a type that either requires cool-down to restrike or takes considerable time to achieve full brightness. An exception to the quartz-restrike would be to provide a means to ensure the luminaire does not lose its arc during transition from normal or generator and back again.

H. Existing ACPs where roadways within the ACP are revised in width or geometry are required to bring that specific entire ACP Zone (approach zone, control zone or response zone) into compliance with the lighting levels. If adjoining ACP Zone(s) are not in compliance, then transitioning lighting is required from the upgraded zone to the existing zones.

I. Exterior lighting poles and the electrical connections shall be frangible when required by MUTCD.

J. Poles are to be located at least 2 ft. from any road edge or curb face. Comply with AASHTO Roadway Design Guide break-away requirements.

K. Exterior canopy lighting control requirements are to be coordinated with the local installation as to location and method. Command and Control shall be provided with a Hand/Off/Automatic controller(s) with the automatic means, as a minimum, being a photocell for controlling the Approach Zone, Access Control Zone and Response Zone, unless the Customer approves in writing an alternate location or different requirements.

L. Exterior doors are to have a luminaire above or adjacent to the door that can be controlled via an automatic means such as a photocell or a manual means. These luminaires shall be LED unless local conditions dictate a more appropriate light source. The following facilities are exempt from this requirement: ID Check Guard Booths, Pedestrian ID Check and Overwatch building.

M. Provide an open/close visual indicator on the ID Check canopy over each lane that is controlled from the ID Check area or Command and Control. The preferred style of indicator is the red “X” and green “Arrow”, but other types are allowed if approved in writing by the local installation and the COS-ACP.

N. Provide an open/close visual indicator on the Search canopy(s) or Enclosed Facility over each lane that is controlled from the Canopy area or Command and Control. The preferred style of indicator is the red “X” and green “Arrow”, but the two head traffic signal (red/green) is allowed, but other types are allowed, such as red/green signal, if approved in writing by the local installation and the COS-ACP. Luminaires shall be Light Emitting Diode (LED). If there is only one search lane, then it is up to the Installation to determine if a visual indicator is desired. If the approach lanes have curves such that the line of site for drivers would make it difficult to see the

canopy mounted indicators, additional indicators should be added in the approach zone to make drivers aware of lanes that are open/closed.

O. Provide under-vehicle lighting, when required by the User, for one lane in each Search Area. The lane must be under the canopy. Those areas that may have snowplows go through the lane are to ensure the lights are flush with or below the finished surface. Provide a manual switch in the area to turn the lights on/off. The local installation can state in writing that they do not want this under-vehicle lighting. Only those lanes under a canopy can have under-vehicle lighting.

2.14.2. Interior Lighting

A. Interior lighting shall comply with UFC 3-530-01 "Design: Interior and Exterior Lighting and Controls "and with the sustainability requirements.

B. Lighting for most spaces with suspended acoustic ceilings shall be of the recessed type.

C. Lighting in Command and Control, ID Check Guard Booth, Pedestrian ID Check, and Overwatch facility shall be dimmable.

D. Emergency and Exit Lighting. Provide emergency lighting and exit lighting per NFPA 101, UFC 3-600-01 "Fire Protection Engineering Facilities" and UFC 4-010-01 "DoD Minimum Antiterrorism Standards for Buildings". Emergency and exit access lighting are to be on battery backup. Facilities that have stand-by generator power are required to have the power to the emergency and exit lights on a generator circuit and also have battery back-up. The battery back-up is considered the primary source. All signage as required by life safety codes are to be included in designs.

2.14.3. General Power Requirements

A. Requirements for heating, ventilation, and air conditioning system shall be determined by the project criteria package. Access around equipment shall be provided for service and air flow. In cold climates, provide features that will protect plumbing, water lines, and other lines from freezing.

B. The power panelboard shall not be installed below a counter. This includes prefabricated structures such as the Vehicle ID Check Area Guard Booths, Pedestrian Check Area both and Overwatch Booth.

C. Exterior Wiring. Direct buried wiring is not allowed. All 600V or less wiring shall be in conduit. If the conduit is within six (6) ft. of a roadway, then the conduit shall be concrete encased or in rigid steel conduit. All wiring over 600V shall be concrete encased.

D. Provide power receptacles per NFPA 70 and in conjunction with the proposed equipment and furniture layouts. Provide duplex receptacles adjacent (at least 6 inches away) to each telecommunication outlet. Special receptacles may be required for equipment to be installed by others to include package scanners. The following are in addition to the general requirements.

   i. Search Function/Bus Shelter is to have at least one duplex receptacle.

   ii. ID Check Guard Booth, Pedestrian ID Check, Overwatch Building. Provide one duplex receptacle at the counter that is either on a UPS circuit or provide a standalone UPS.

   iii. ID Check Guard Booth. Provide an exterior receptacle on each of the narrow ends. Provide at least one receptacle below the eave along each of the long sides.

   iv. Overwatch Pad. Provide a duplex receptacle at the pad.

v. ID Check Canopy. Provide at least one duplex receptacle per island.

vi. Truck Search Area Canopy or Enclosed Facility, Passenger Vehicle Search Area Canopy or Enclosed Facility. Provide at least one duplex receptacle on a column on each side of the inspection space. Provide a dedicated circuit for each side of the inspection space receptacles.

vii. ID Check Canopy, Truck Search Area Canopy, Passenger Vehicle Search Area Canopy. Coordinate with the User on any special power requirements for portable heaters or misters. This typically will require a 20-amp circuit at either 208VAC, 240VAC, 277VAC or similar voltage depending on the country. Provide an appropriate receptacle for the amperage and voltage configuration and have an adjacent disconnecting means.

viii. Truck Search Enclosed Facility, Passenger Vehicle Search Enclosed Facility. Provide duplex receptacles spaced around the perimeter of the inspection space. Provide a dedicated circuit for each side of the inspection space.

E. Other Equipment and Systems. See discussion on COMMUNICATIONS AND SECURITY SYSTEMS for other equipment and systems that will need power. Provide power for communications equipment per UFC 3-580-01 Telecommunications.

F. Power Handhole. Provide a power handhole in each island/median in the ID Check Area. Conduit shall be run from the handhole to the island/median guard booth and to the next island/median handhole. This handhole/conduit system shall be used for all 600V or less power to the ID Check guard booths and to the area. The handhole cover is to be flush with the island/median.

G. Design and locate the service transformer(s) to be either located within the ACP corridor (inside the passive barrier) or on the outside. Location needs to ensure access is maintained to the transformer. If on the outside, this may include a manual gate with the appropriate crash rating in the passive barrier.

H. Panelboards and other cabinets that are located in the ID Check Area or in Search Areas cannot be located closer than 18 inches to the curb face. Locations where the equipment may be struck by an errant vehicle are to provide bollards for protection.

I. Search Canopies. Provide traffic arms with a signal light for each search lane.

J. ID Check area. Provide a traffic arm with or without a signal light for each ID Check Lane, if the installation is not on the list to have fixed Automated Installation Entry installed at this ACP.

2.14.4. Back-up Power

A. Generator

i. Automatic start-up within 10 seconds after the normal source of electrical power fails.

ii. Generator shall have an alternate fuel source and/or sufficient on-site fuel to maintain full-load operation for a minimum of 12 hours. Natural gas line to the generator will be accepted as meeting the 12 hr. on-site fuel source.

iii. Status monitored at Command and Control to include alarms for loss of normal power, generator malfunction, and low fuel.

iv. The generator is to be installed so that it is at least 30 feet from the service entrance transformer and 30 ft. from any ACP building.

v. Design and locate the generator to be either located within the ACP corridor (inside the passive barrier) or on the outside. Location needs to ensure access to the generator is maintained for adding fuel and performing maintenance. If on the outside, this may include a manual gate with the appropriate crash rating in the passive barrier.

vi. The following loads shall be on generator power:

a. Interior lighting for Command and Control, the Gatehouse, Guard Booths, Pedestrian ID Check, Overwatch position, and Search Offices.

b. Canopy lighting in the ID Check Area and the Search Areas.

c. Where canopies are utilized for Search Areas: Canopy lighting for the Search Areas.

d. Where enclosed facilities are utilized for search areas: Interior lighting for the Search Area Enclosed Facility.

e. External lighting in the Access Control Area.

f. External lighting in the Search Areas this shall include 100 ft. on both sides of the Search canopy.

g. Approach Zone and Response Zone lighting within 100 feet of the Access Control Zone.

h. External lighting 150 feet on both sides of the final vehicle barriers.

i. ID Check Area traffic arms.

j. Uninterruptible Power Supplies (UPS).

k. Search Area traffic arms.

vii. Under Vehicle Inspection System (UVIS). An ACP is not required to have a UVIS, but if provided then all equipment associated with the UVIS system needs to be on generator power.

B. Uninterruptible Power Supply (UPS). The ACP shall have one or more hard-wired Uninterruptible Power Supplies to power critical security, Communications, and safety loads when the normal source of electrical power fails. Plug in electrical connection is not acceptable. The UPS shall provide a minimum of 10 minutes back-up power. A centralized UPS is to have a remote monitoring panel located at the Command and Control to report alarms associated with the UPS. The following loads shall be on UPS:

i. Primary communications system

ii. Duress alarm system.

iii. Computers.

iv. CCTV system.

v. Intrusion Detection Systems (IDS).

vi. Automation (Automated Installation Entry) excludes the island traffic arms.

vii. Lighting:

a. One luminaire for each ID Check Lane. This luminaire shall be located near the location where ID checks are performed.

b. One luminaire at each Active Vehicle Barrier to include requirement of CCTV cameras for real time assessment of activity detail.

viii. Access Control Equipment including:

a. Active vehicle barrier controls.

b. Active barrier activation system for one complete operation cycle (opens to close and close to open). Hydraulic systems do not need to have the pump motor on UPS, if the system can maintain enough pressure for 1.5 cycles. The hydraulic pump motor then only needs to be on generator back-up power for a hydraulic system having sufficient capacity.

c. Traffic arms located at the active vehicle barriers.

d. Traffic sensors (wrong way, over speed, and presence detectors). Traffic signals and warning lights.

ix. Under Vehicle Inspection System (UVIS). The computer that operates the UVIS needs to be on UPS.

2.14.5. Lightning Protection System

A. A risk analysis per NFPA 780 is to be performed to determine if a lightning protection system is required. If required, but the installation does not desire a lightning protection system, then the installation shall provide direction in writing.

B. The lightning protection systems are to comply with the requirements found in UFC 3-575-01 “Lightning and Static Electricity Protection Systems”.

C. Provide surge protection per requirements found in UFC 3-575-01 “Lightning and Static Electricity Protection Systems” and UFC 3-520-01 “Interior Electrical Systems”. In addition, all exterior power panelboards and those panelboards that primarily power communications, LAN, exterior site lighting, security equipment and active vehicle barrier controls are to have surge protection.

2.15. HEATING VENTILATING AND AIR CONDITIONING (HVAC) REQUIREMENTS:

OCONUS: All construction outside of the United States is also governed by Status of Forces Agreements (SOFA), Host Nation Funded Construction Agreements (NNFA), and in some instances, bilateral Infrastructure Agreements (BIA). Compliance with the most stringent of any UFC applicable, the SOFA, the HNFA, and the BIA, as applicable.

2.15.1. Sizing

A. The capacity of HVAC systems and equipment shall be calculated in accordance with ASHRAE Handbooks, ASHRAE 62.1, ASHRAE 55, and ASHRAE 189.1. Outdoor and Indoor Calculations and Requirements: Indoor design conditions and load calculations shall be in accordance with UFC 3-410-01FA “Heating, Ventilating, and Air Conditioning”. Outdoor air and exhaust ventilation requirements for indoor air quality shall be in accordance with ASHRAE 62.1-2007. All Buildings with minimum LEED Silver requirement (or better) will earn LEED Credit EQ 7.1, Thermal Comfort-Design, except were precluded by other project requirements.

B. Indoor Air Quality: Buildings indoor air quality systems, thermal comfort, acoustical control, equipment, calculation procedures, construction and start-up shall comply with ASHRAE Standard 189.1, Section 8.3, Mandatory Provisions, and Section 8.4, Prescriptive Option, or Section 8.5, Performance Option.

C. Outdoor Air Delivery Monitoring: Spaces Ventilated by Mechanical Systems. Reference Sections 7.4.3.2, 8.3.1.2.1, and 10.3.2, of ASHRAE Standard 189.1. A densely occupied space is defined as those spaces with a design occupant density greater than or equal to 25 people per 1000 ft2.

D. Environmental Tobacco Smoke:

i. Smoking shall not be allowed inside the building. Signage stating such shall be posted within 10 ft. of each building entrance.

ii. Any exterior designated smoking areas shall be located a minimum of 50 ft. away from building entrances, outdoor air intakes, and operable windows.

iii. Section 6.2.9 of ANSI/ASHRAE Standard 62.1 shall not apply.

2.15.2. Ballistic Resistant Rated Structures

A. Command and Control function

The occupied portions of the command-and-control functional areas of combined facilities, which are a ballistically protected area, are to be heated and air conditioned, and controlled for temperature (settings) are to be easily accessed by staff. Locate mechanical equipment when provided for heating and cooling in the Mechanical equipment room or in other areas where space is provided for clearance and accessibility for maintenance. Provide insulation on all ductwork, equipment, and other items as required by code. Provide toilets when required and janitor closets or areas with a mop sink with an exhaust system. The system is to maintain exhaust rates as required by the applicable code. Exhaust fans are to be accessible for repair or maintenance. Communications room when provided are to be air conditioned to maintain a space temperature of 75 degrees F at the design load. The mechanical/electrical room and inside storage is to be heated and ventilated as required by code and to prevent damage from excessive space temperatures.

B. ID Check Guard Booth

This is a ballistic rated structure, heating and air conditioning of the structure is mandatory.

C. Overwatch Building.

This is a ballistic rated structure, heating and air conditioning of the structure is mandatory.

D. Pedestrian ID Check & (Pedestrian ID Check functional areas “room”)

This is a ballistic rated structure, heating and air conditioning of the structure is mandatory.

2.15.3. Non-Ballistic Resistant Rated Structures

A. Search Area Building and Search Function

For large and small standard army design or custom type Search Area Buildings, and search functions or rooms of combined facilities: Occupied portions of the facility are to be heated and air conditioned for occupant comfort, unless otherwise not required by the Installation Design Guidance (IDG). Search area may not be air conditioned. Controls for temperature settings are to be easily accessed by staff. Locate mechanical equipment for heating and cooling in the Mechanical equipment room when required or in other areas where space is provided for clearance and accessibility for maintenance. Provide insulation on all ductwork, equipment, and other items as required by code. Provide Toilet when required and janitor

closets or areas with a mop sink with an exhaust system. The system is to maintain exhaust rates as required by the applicable code. Exhaust fans are to be accessible for repair or maintenance. The mechanical and electrical rooms and inside storage are to be heated and ventilated as required by code and to prevent damage from excessive space temperatures.

B. Two (2)- Three (3)- Six (6)- Nine (9) Processor Visitor Control Center & (Combined facilities including Visitor Processing)

Occupied portions of the facility (Office, Provost Marshal, Vestibule, Hall, and Breakroom, Etc.) and the visitor processing area of combined facility are required to be heated and air conditioned for occupant comfort. Controls for temperature settings are to be easily accessed by staff. Locate mechanical equipment for heating and cooling in the Mechanical room when required or in other areas where space is provided for clearance and accessibility for maintenance. Provide insulation on all ductwork, equipment, and other items as required by code. Provide Toilet when required and janitor closets or areas with a mop sink with an exhaust system. The system is to maintain exhaust rates as required by the applicable code. Exhaust fans are to be accessible for repair or maintenance. Communications room when required are to be air conditioned to maintain a space temperature of 75 degrees F at the design load. The mechanical/electrical room and inside storage is to be heated and ventilated as required by code and to prevent damage from excessive space temperatures.

C. Environmental Requirements for Communications Rooms:

Comply with ANSI/EIA/TIA 569 (including applicable Addenda). Maintain environmental conditions at the Class 1 and 2 Recommended Operating Environment. Before being introduced into the room, filter and pre-condition outside air to remove particles with the minimum MERV filtration quality shown in the ASHRAE HVAC Applications, Chapter 19. Maintain rooms under positive pressure relative to surrounding spaces. Design computer room air conditioning units specifically for Communications room applications. Build and test units in accordance with the requirements of ANSI/ASHRAE Standard 127. A complete air handling system shall provide ventilation, air filtration, cooling and dehumidification, humidification (as determined during the design phase), and heating. The system shall be independent of other facility HVAC systems and operation shall be required year-round.

2.16. ENERGY CONSERVATION REQUIREMENTS

OCONUS: All construction outside of the United States is also governed by Status of Forces Agreements (SOFA), Host Nation Funded Construction Agreements (NNFA), and in some instances, bilateral Infrastructure Agreements (BIA). Ensure compliance with the most stringent of any UFC applicable, the SOFA, the HNFA, and the BIA, as applicable.

2.16.1. Whole Building Approach

A whole building approach should be used in achieving the target energy reduction. Energy consumption levels for both the baseline and proposed building shall be determined by using the Performance Rating Method found in ASHRAE Standard 90.1-2007 Appendix G, with process and plug loads; see paragraph Energy Policy. All calculations shall be performed using a professionally recognized and proven computer program or programs that integrate architectural features with air-conditioning, heating, lighting, and other energy producing and consuming systems. These programs will be capable of simulating the features, systems, and thermal loads used in the design. The energy savings and any parasitic energy loads associated with the utilization of recovered energy and other renewable or waste heat applications shall be included. All calculations shall be included as part of the design analysis. A summary of the energy reduction features should also be included as part of the design analysis. This summary should include for

both the baseline and proposed building such items as building insulation values, glass SHGC and U-factor, roof construction, equipment efficiencies and lighting levels.

2.16.2. Energy Calculation Methodologies and Substantiation Requirements:

The calculation methodology used for the documentation and analysis shall follow the guidelines set forth in Appendix G of ASHRAE 90.1, with the exception that receptacle and process loads may not be omitted from the calculation and; this calculation shall address all energy consuming systems in a single integrated methodology. Individual calculations for heating, cooling, power, and lighting systems etc. will not be acceptable. The following building simulation software is acceptable for use in calculating building energy consumption: Hourly Analysis Program (HAP) by Carrier Corp., TRACE 700 by Trane Corp., DOE-2 by US Department of Energy, and EnergyPlus by DOD/DOE.

2.16.3. Design After Award

Interim and final design submittals shall demonstrate that each building including the building envelope, HVAC systems, service water heating, power, and lighting systems meet the Mandatory Provisions and the Prescriptive Path requirements of ASHRAE 90.1. Interim and final design submittals which address energy consuming systems, (heating, cooling, service hot water, lighting, power, etc.) must also include calculations in a separate Energy Conservation Section of the Design Analysis which demonstrate and document:

A. The baseline energy consumption for the facility or facilities under contract, that would meet the requirements of ANSI/ASHRAE/IESNA Standard 90.1-2007,

B. The energy consumption of the facility or facilities under contract utilizing the materials and methods required by this construction contract.

2.17. FIRE PROTECTION REQUIREMENTS:

OCONUS: All construction outside of the United States is also governed by Status of Forces Agreements (SOFA), Host Nation Funded Construction Agreements (NNFA), and in some instances, bilateral Infrastructure Agreements (BIA). Ensure compliance with the most stringent of any UFC applicable, the SOFA, the HNFA, and the BIA, as applicable.

2.17.1. Building Function Requirements

The facilities shall be designed in compliance with UFC 3-600-01 “Fire Protection Engineering for Facilities”. The typical construction is Type IIB. The facilities are a combination of Business and Assembly occupancies. Due to the nature of the facility (size, and mission criteria), the facilities are generally not provided with a fire sprinkler system unless officially requested by a specific command. For Life Safety and Egress, the latest version of NFPA 101 shall be used in the development of the buildings. For general square footage, building areas, and heights, the latest version of IBC shall be complied with in the development of the buildings.

2.17.2. Fire Alarm System

The fire alarm system, when required, is to comply with UFC 3-600-01 “Fire Protection Engineering for Facilities". Buildings with a fire alarm system shall have an addressable fire alarm evacuation system with manual pull stations (break glass not allowed), audible and visual alarms. The facilities shall be designed in compliance with UFC 3-600-01, and NFPA 101

2.17.3. Mass Notification

Mass notification system is to be integrated into the fire detection system when both are required. The building mass notification system is to meet the requirements of UFC 4-021-01 “Design and Operation & Maintenance (O&M): Mass Notification System. The system is to be fully compatible with local mass notification system.

2.18. SUSTAINABLE DESIGN

OCONUS: All construction outside of the United States is also governed by Status of Forces Agreements (SOFA), Host Nation Funded Construction Agreements (NNFA), and in some instances, bilateral Infrastructure Agreements (BIA). Ensure compliance with the most stringent of any UFC applicable, the SOFA, the HNFA, and the BIA, as applicable.

2.18.1. General

Many features that make a facility sustainable can be integrated into a typical building and site. Reduction in the use of water is a key element that generally applies to every building and site. However, other very beneficial features/techniques (such as shading devices for buildings or building orientation for sites) or materials might also have application but need to have a more tailored building and site to be effective.

The offeror (for design-build contracts) or designer (for design-bid-build contracts) is encouraged to suggest sustainable material substitutions or building feature modifications for consideration where they appear to provide benefit without appearing to interfere with functionality. One aspect of sustainability is the over-all energy consumption of a building and mandated federal criteria are regularly being revised to decrease such energy consumption by increasing energy efficiency.

Documents, such as ASHRAE 189.1-2009, have been developed to focus building design on steadily improving their levels of energy efficiency.

It is expected that meeting certain levels of energy efficiency will require the use of such features as horizontal shades or overhangs above windows in hotter climates and these techniques are acceptable even though not required for every climate application. The target for this facility type at the time this Army Standard Design was approved for application to specific projects was 30% energy savings from the base-line energy use defined in the criteria of ASHRAE 90.1-2007. The U. S. Army has decided to include/use site energy for the HVAC, lighting, and hot water loads to determine the energy savings.

It is recommended that facilities provided for climate zones 1a & b, 2a & b and 3a, b & c have horizontal shades above the windows, shading grills, or other devices or building geometry (like being deeply recessed) techniques (clerestories close to the roof line may accomplish the same benefit with overhangs) to allow for meeting the required energy savings.

It is assumed that both the governing criteria and the energy target (as defined by the U. S. Governments and organizations such as the United States Green Building Council (USGBC)) will change regularly. Provide every facility (these will generally be projects appropriated at specific times over several years) so that it meets the requirements of governing criteria and the energy target that are applicable at the time of project development.

Many federally mandated definitions/requirements or measures of energy consumption criteria (energy cost savings) are not identical with other measures of energy efficiency or sustainability. Examples of different measures are those described in the USGBC “LEED” point criteria.

Provide a comprehensive analysis of energy consumption during specific project design processes and incorporate what appears to be the best/most-appropriate blend of features/characteristics that will reduce

energy consumption of the facility to the minimum practicable levels. Also meet whatever the current mandates or criteria that apply at the time of the specific project under design:

A. FY08-FY12, and FY13 and beyond: New facilities or minor renovations that don't meet LEED minimum program requirements (occupied building, climate control (heating and/or cooling) for human comfort and 1000 S.F. or greater):

   i. Scored using LEED-NC and incorporate sustainable design features to the maximum extent life cycle cost effective and technically possible.

   ii. Supporting documentation will be developed (including LEED checklist).

2.18.2. LEED and Third-Party Validation

Reference: UFC 1-200-02 High Performance and Sustainable Building Requirements, latest

A. GENERAL. Except where indicated otherwise, these requirements apply worldwide to all facility construction activities on permanent Active Army installations, Army Reserve, Army Readiness Centers, Army National Guard Facilities and Armed Forces Reserve Centers, regardless of funding source and including Base Realignment and Closure (BRAC) and non-Army tenant facilities on Army property. For tenant projects on Army property, USACE project Master Planner and Project Manager (PM) will make the tenant organization aware of Army Sustainability requirements and the tenant responsibility to coordinate directly with the installation Department of Public Works (DPW) if the requirements cannot be met. These requirements apply to permanent facility construction only. Excluded are overseas contingency construction and continental United States (CONUS) interim facilities. However, overseas contingency construction and CONUS interim facilities should incorporate as many sustainability features as life cycle cost effective especially passive sustainability measures. The UFC 1-200-02 "High Performance and Sustainable Building Requirements" will be used for all DOD projects, except ASHRAE 90.1-2007 shall be used and work for other customers where appropriate. All construction outside of the United States is also governed by Status of Forces Agreements (SOFA), Host Nation Funded Construction Agreements (NNFA), and in some instances, bilateral Infrastructure Agreements (BIA). Therefore, the acquisition team must ensure compliance with the most stringent of the UFC, the SOFA, the HNFA, and the BIA, as applicable.

B. MINIMUM REQUIREMENT - NEW FACILITIES IN THE UNITED STATES AND ITS TERRITORIES. Facilities which meet the requirements for Sustainability HPSB validation shall be registered with one of the organizations which provide sustainability validation indicated in the UFC. The project shall incorporate all applicable requirements of the DoD or Army Sustainability/HPSB Score Sheet. Sustainability validation shall be completed by one of the validation methods through one of the organizations indicated in the UFC. DoD or Army Sustainability/HPSB Score Sheet shall be completed and updated throughout the project life and copies shall be forwarded to the Army PM at each design phase and upon request during construction. Final validation and certification documents shall be forwarded to the PM for record and data calls. Projects which do not meet minimum requirements for sustainability validation or certification shall document sustainability features which are applicable to the scope involved. Documentation of this type of projects shall use the DoD or Army Sustainability/HPSB Score Sheet and additional data collected, such as construction waste recycling shall be provided to the DPW and the Army PM.

C. ENERGY POLICY

Directive and Guidance for FY13 and beyond MCA Projects - See Reference ECB 2012-13.

   i. References:

a. Memorandum, ASA (IE&E), 27 Oct 10, Subject: “Sustainable Design and Development Update (Environmental and Energy Performance)”

b. ANSI/ASHRAE/IESNA Standard 189.1-2009: “Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings”

c. Memorandum of Understanding (MOU), 06 Mar 2006, “Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings”

d. Engineering and Construction Bulletin (ECB) 2011-1, 19 Jan 2011, Subject: “High Performance Energy and Sustainability Policy”

e. Engineering and Construction Bulletin (ECB) 2012-13, 23 Apr 2013, Subject: “Energy Implementation Guidance Update, ASHRAE 189.1, Life-Cycle Cost Analysis Requirements”

f. Energy Independence and Security Act (EISA) of 2007, Section 433” Federal Building Energy Efficiency Performance Standards”

g. Methodology and Procedures for Life-Cycle Cost Analysis, Subpart A, Code of Federal Regulations, Part 436

h. ANSI/ASHRAE/IES Standard 90.1-2010 “Final Qualitative Determination, Pacific Northwest National Laboratory”, October 2011

ii. General

a. The purpose is to update and clarify the Energy and Sustainability guidance previously issued by ECB 2011-1 (Reference d). Specifically, this establishes a minimum energy requirement for compliance with ASHRAE Standard 189.1-2009 (Reference b) for prescriptive and performance paths and establishes ASHRAE Standard 189.1 as our baseline facility criteria for the purpose of life-cycle cost analysis (LCCA). Previous guidance issued in ECB 2011-1 related to LCCA for features that exceed 1% of the Programmed Amount will no longer apply starting with FY13 projects and beyond. Instead, projects should follow guidance stated herein.

b. We are in the process of reviewing the most current versions of ASHRAE Standards 189.1-2011 and 90.1-2010 to determine what the impacts are, if any, of adopting the latest versions of the Standards. ASHRAE Standard 189.1-2011 references the 2010 version of ASHRAE Standard 90.1 and according to an analysis conducted by the Pacific Northwest National Laboratory (Reference g) there are 109 changes to the 90.1-2010 version compared to the 90.1-2007 version of which 62 changes have an impact on energy. Expect additional guidance regarding adoption of these new standards.

c. As stated in ECB 2011-1 (Reference d), all FY13 and beyond projects are required to meet the Energy and Sustainability requirements of ASHRAE Standard 189.1 according to Department of the Army Sustainable Design and Development Policy Update (Reference a) with the noted exemptions. The Army established ASHRAE Standard 189.1 as a minimum standard and recognizes that Congressional Law and Executive Orders drive project solutions beyond the requirements of ASHRAE Standard 189.1; an example being EISA 2007 fossil fuel reduction targets (Reference e).

d. The Energy Independence & Security Act of 2007 (EISA 2007) requires the progressive reduction in site fossil fuel use, compared to a 2003 Commercial building Energy Consumption survey (CBECS) average per building type as published by the Energy Information Administration (EIA), with the goal of eliminating consumption of fossil fuels by 2030.

e. In terms of the fossil fuel reduction statute, there is currently no formal guidance issued by an expert agency detailing how the calculations for fossil fuel reduction should be performed. In general, DOD implementation guidance would follow expert agency guidance. In absence of formal implementation guidance, USACE cannot require the fossil fuel avoidance as pertains to EISA 2007, which requires a reduction of 65% for the average building type in CBECS with respect to ASHRAE 90.1-2007 for buildings FY15-FY19 and 55% reduction respectfully for FY10-FY14.

f. Per Army Policy, ASHRAE 189.1 is a minimum requirement and shall be used as the project baseline for life-cycle cost comparisons. A LCCA is not required on the baseline project. An incremental LCCA shall be completed for all energy efficiency or conservation features provided in excess of the baseline to ensure the payback period is no greater than the lesser of 40 years or the projected life of the facility. Equipment procurement, fuel, maintenance, repair, replacement, and any other quantifiable benefits and costs are to be included in the LCCA. The LCCA will be documented and made part of the design analysis.

g. When applying ASHRAE Standard 189.1 energy performance standards, ensure that the minimum energy savings to be achieved, through performance or prescriptive paths, is at least 30 percent better than ASHRAE Standard 90.1-2007 (including process and plug loads) by the use of Energy use analysis: see paragraph Energy Conservation. This 30 percent savings threshold may in some cases be a slight improvement upon the standard for certain facility types in some climatic zones.

h. The Energy Policy Act of 2005 (EPact 2005) amended and extended by Executive Orders, subsequent legislation, and the “Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding” (FLHPSB MOU) establishes a betterment goal for the proposed project compared to an ASHRAE 90.1-2004 standard baseline model. Epact is applicable to all buildings and is an Energy Use based analysis, which excludes plug and process loads but the requirements of the paragraph above including process and plug loads is a much more extensive, conservative and stricter requirement for energy use savings.

i. 10 CFR Part 436 (Reference f) establishes a methodology to conduct a LCCA for determining energy and water conservation improvements for Federal Buildings. The Building Life-Cycle Cost (BLCC) program developed by the National Institute of Standards and Technology (NIST) was designed to comply with 10 CFR Part 436 and includes a MILCON Analysis module. All project delivery teams shall use the BLCC program and follow the methodology in 10 CFR Part 436 to determine the LCCA for each project when requesting additional funds for features in excess of the baseline described in paragraph (c). A link is provided below with instructions on how to download the BLCC program for free:

http://www1.eere.energy.gov/femp/information/download_blcc.html

j. A request for an exemption to HQUSACE may be made for any specific requirement included herein or by reference that the PDT determines would adversely affect mission performance, security requirements, health, safety, or welfare. The request for exemption shall only apply to the specific requirements in conflict. Any approved exemptions to the guidance shall be documented with reference to the specific requirement in conflict and included in the project documentation.

2.19. CYBERSECURITY FOR FACILITY RELATED CONTROL SYSTEMS (FRCS):

All planning, design, and construction of FRCS for existing and new facilities including integration into existing control systems shall be done in accordance with the requirements set forth. The following is a non-comprehensive list of potential FRCS:

A. Electronic Security Systems (ESS) which include Intrusion Detection Systems (IDS), Access Control Systems (ACS), and Video Monitoring Systems/Closed Circuit TV (CCTV)

B. Fire Protection Life-Safety Systems which include Fire Alarm Reporting System (FA), Fire Suppression System, Mass Notification System (MN) and Sound Masking Systems

C. Building (Level) Automation Control System (BCS) which includes Heating, Ventilation and Air Conditioning Systems (HVAC) and Direct Digital Control (DDC)

D. Energy Monitoring and Control System (EMCS) and Utility Monitoring and Control System (UMCS)

E. Building Lighting System (UFC 3-530-01) and Receptacle Control System

F. Physical Access Control Systems (PACS)

G. Variable Frequency Drives

H. Automated Rollup Doors

I. Automated Window Shades

J. Electrical Distribution System (Exterior and Interior) with micrologic processors

K. Generator, Controller, Automatic Transfer Switch and Uninterruptible Power Supply

L. Utility Metering System (Advanced Meters, AMI, etc.)

M. Public Address System (PA)

N. Audio/Visual Systems (A/V)

O. Supervisory Control and Data Acquisition (SCADA) Systems

P. Gate Controllers

Q. Other FRCS as defined by Project Requirements, and not specifically identified. Any system, or component of a system, which has wireless, radio frequency (rf), Bluetooth, network communication capabilities, or a port for connecting a laptop/computer.

As the project design progresses the inventory list of FRCS will be narrowed and fully defined and edited. 25 05 11 Cybersecurity for Facility-Related Control Systems specification sections will be included. An ECIFP (Engineering Considerations and Instructions for Field Personnel) will be provided to Construction to facilitate the implementation of cybersecurity controls and inventorying process.

Preliminary categorization for this facility is presumed to be mission essential, depending upon the existence of an alternate ACP. Refer to "Distribution of the FRCS Master List Memo - signed 7_16_21" and "Addendum - FRCS Master List Update 7_16_21". The Confidentiality-Integrity-Availability (C-I-A) Impact Level Ratings may be taken from the FRCS Master List as preliminary until all of the FRCS has been inventoried, and the respective System Owner (SO), Information System Security Manager/Officer (ISSM/ISSO) is able to provide the respective C-I-A impact level ratings in accordance with UFC 04 010 06.

Identification of the SO, ISSM/ISSO is the first and foremost task of the Cybersecurity Subject Matter Expert (SME) or Cybersecurity Designer, whose credentials should be a minimum Information Assurance Manager (IAM) Level II Certification per DoD 8570.01-M.

Provide a Cybersecurity Design Analysis write up which documents the cybersecurity design process for the project.

2.20. FACILITY SPECIFIC REFERENCES

A. These references are to be included [in addition to those in Part 3 of the Army RFP Wizard].

i. ASTM F2656/F2656M (2018a) “Standard Test Methods for Vehicle Crash Testing of Perimeter Barriers”

ii. Military Surface Deployment and Distribution Command Transportation Engineering Agency (SDDCTEA) Pamphlet 55-15, “Traffic and Safety Engineering for Better Entry Control Facilities”

iii. Army Standard (AS) for Access Control Points (ACPs) – 13 April 2012 available at: https://mrsi.erdc.dren.mil/cos/army-standards

B. OTHER UFC REFERENCES IN THIS STANDARD:

UFC 1-200-02 (2022) High Performance and Sustainable Building Requirements, with Change 2

UFC 3-101-01 (2021) Architecture with Change 1

UFC 3-201-01 (2021) Civil Engineering, with Change 5

UFC 3-240-01 (2021) Wastewater Collection and Treatment, with Change 2

UFC 3-301-01 (2022) Structural Engineering, with Change 1

UFC 3-410-01 (2021) Heating, Ventilating, and Air Conditioning Systems, with Change 8

UFC 3-420-01 (2021) Plumbing Systems

UFC 3-520-01 (2021) Interior Electrical Systems, with Change 2

UFC 3-530-01 (2019) Interior and Exterior Lighting and Controls, with Change 4

UFC 3-575-01 (2021) Lightning and Static Electricity Protection Systems, with Change 1

UFC 3-600-01 (2021) Fire Protection Engineering for Facilities, with Change 6

UFC 3-701-01 (2022) DoD Facilities Pricing Guide, with Change 1

UFC 4-010-01 (2022) DoD Minimum Antiterrorism Standards for Buildings with Change 2

UFC 4-010-06 (2017) Cybersecurity of Facility-Related Control systems, with Change 1

UFC 4-020-02FA (2005) Security Engineering: Concept Design (FOUO)

UFC 4-020-03FA (2005) Security Engineering: Final Design (FOUO)

UFC 4-021-01 (2010) Design and O&M: Mass Notification Systems, with Change 1

UFC 4-021-02 (2019) Electronic Security Systems, with Change 1

UFC 4-022-01 (2017) Security Engineering: Entry Control Facilities / Access Control Points

UFC 4-023-07 (2017) Design to Resist Direct Fire Weapons Effects, with Change 1

ANSI A137.1 (2019) Specifications for Ceramic Tile

ASTM F1066 (2004; R 2018) Standard Specification for Vinyl Composition Floor Tile

ASTM F2656/F2656M (2020) "Standard Test Methods for Vehicle Crash Testing of Perimeter Barriers"

FISMA Federal Information Security Modernization Act, dating back to 2002

Military Surface Deployment and Distribution Command Transportation Engineering Agency (SDDC-TEA) Pamphlet 55-15, "Traffic and Safety Engineering for Better Entry Control Facilities" available at: https://www.sddc.army.mil/sites/TEA/Functions/SpecialAssistant/TrafficEngineeringBranch/Pages/pamphlets.aspx

Army Standard (AS) for Access Control Points (ACPs) – 13 April 2012 available at: https://mrsi.erdc.dren.mil/cos/army-standards

2.21. ACP WAIVERS

See Army Standard (AS) for Access Control Points (ACPs). Army Standard exception and waiver process is identified in AR 420-1.

Waivers to the Army ACP Standard Design must require a COS position statement and approved by HQ USACE.

APPENDIX A

COST INFORMATION

Cost Information for DD1391/PAX Support for Access Control Points is available at:

https://mrsi.erdc.dren.mil/cos/nwo/acp/

The cost templates being used for Access Control Points only provides a rough order of magnitude. Specific projects for DD1391/PAX Support shall be coordinated with the U.S. Army Corps of Engineers, Omaha District (Center of Standardization)

APPENDIX B

DRAWINGS (UNDER SEPARATE COVER)

All Standard Design documents including narrative, drawings, and BIM model are available at:

https://mrsi.erdc.dren.mil/cos/nwo/acp/

APPENDIX C

FRCS MASTER LIST 07-16-2021

APPENDIX L
ARMY STANDARD FOR ACCESS CONTROL POINTS

DEPARTMENT OF THE ARMY
ASSISTANT CHIEF OF STAFF FOR INSTALLATION MANAGEMENT
600 ARMY PENTAGON
WASHINGTON, DC 20310-0600

DAIM-ZA

APR 13 2012

MEMORANDUM FOR

Commander, United States Army Corps of Engineers (CEMP), 441 G St NW, Washington, DC 20314
Director, Installation Management Command, 2405 Gun Shed Road, Fort Sam Houston, TX 78234

SUBJECT: Army Standard for Access Control Points

1. The enclosed, Army Standard for Access Control Points (ACP) is approved for implementation. Only the Assistant Chief of Staff for Installation Management has authority to approve exceptions to this standard. Waivers from the Army Standard must be approved in accordance with AR 420-1.

2. The Army Standard is effective for Military Construction design and mandatory, where possible within statutory limitations, for major renovation projects in FY2013 and beyond. Designs based on the Army Standard and the Army Standard Design will be developed consistent with the MILCON Business Process.

3. The points of contact (POC) for the Facilities Design Team are Ms. Elizabeth Troeder, DAIM-ODO, elizabeth.g.troeder.civ@mail.mil, 571-256-8148; Mr. Eugene Smith, DAPM-MPO, eugenea.smith@us.army.mil, 703-695-4210; and Mr. William Miller, USACE NWO, william.d.miller@usace.army.mil, 402-995-2118.

Encl

MICHAEL FERRITER
Lieutenant General, GS
Assistant Chief of Staff
for Installation Management

Printed on Recycled Paper

DEPARTMENT OF THE ARMY
ASSISTANT CHIEF OF STAFF FOR INSTALLATION MANAGEMENT
600 ARMY PENTAGON
WASHINGTON DC 20310-0600

The Army Standard (AS) for Access Control Points (ACPs)

13 April 2012

Description:
An Access Control Point (hereafter referred to as ACP) is a corridor at an Installation perimeter through which all vehicles and/or pedestrians must pass when entering or exiting an Installation cantonment area. An ACP provides the first physical security boundary layer that restricts access to Department of Army (DA) Installation cantonment areas.

ACP Classifications:
DA ACP classifications are: (a) Primary, (b) Secondary, (c) Limited Use, and (d) Pedestrian. Primary and Secondary ACPs can accommodate privately owned vehicles (POV)s, commercial vehicles (trucks), pedestrians or any combination thereof. Primary and Secondary ACPs shall provide the means to defeat a vehicular and/or pedestrian threat via permanent measures defined in this Army Standard for ACPs. Limited Use ACPs shall provide means to defeat vehicular and/or pedestrian threats via temporary or permanent measures. Limited Use ACPs shall not have routine hours of operation. A Pedestrian ACP may be part of an ACP that accommodates vehicles or it may stand alone.

Applicability:
The Army Standard for ACPs applies to the cantonment areas for:

1. All Army Active Installations, the following Army Reserve Installations: Fort McCoy, Fort Dix, Fort Buchanan, Fort Hunter Liggett, Camp Parks, and, Devens Reserve Forces Training Area and the following Army National Guard Installations: Camp Roberts, Arlington Hall, Fort Indiantown Gap, Camp Atterbury, Camp Shelby, Camp Robinson and Gowen Field.
2. Army Reserve Training Centers and Army National Guard sites where movement of personnel or vehicles is from outside the cantonment area and where a U.S. Army Active Installation cantonment area can be accessed from the reserve center. For the purposes of this Standard, Movement of personnel or vehicles between Army Reserve Center or Army National Guard site and U.S. Army Installation does not require an ACP.
3. All Army controlled Joint Base Operations and the ACP projects funded by the Army on Joint bases controlled by others.
4. Active Army Installation access between cantonment and non-cantonment areas where adjacent non-cantonment areas can be accessed by non-vetted personnel.
5. Both CONUS and OCONUS ACPs.

This Army Standard for ACPs supersedes all previous versions and any facility space allowance standards and/or criteria contained in other facilities engineering and/or Installation management documents and serves as the primary authority for Army ACPs worldwide.

If a difference exists between the Army Standard for ACPs and the Army Standard Design for ACPs the Army Standard for ACPs shall govern.

Waivers:

- Only the Assistant Chief of Staff for Installation Management (ACSIM) has authority to approve waivers and exceptions to the Army Standard for ACPs.
- Waivers from the Army Standard for ACPs must be requested in accordance with Army Regulation (AR) 420-1 *Army Facilities Management* (see Appendix G).
- All waiver requests to the Army Standard for ACPs require Center of Standardization (COS) for ACPs conflict resolution prior to submission by the Garrison Commander to the respective IMCOM Region, HQ IMCOM and the ACSIM. Non-IMCOM Installations or activity requests are sent, upon endorsement by their Senior Commander, to their owning Army Command (ACOM), Army Service Component Command (ASCC), or Direct Reporting Unit (DRU) instead of the IMCOM Region and HQ IMCOM, and then sent to the ACSIM.
- Waiver requests must be received in sufficient time to allow the Facility Design Team (FDT) to complete review and development of recommendation(s) or course(s) of action for the Army Facilities Standardization Committee (AFSC) to consider prior to its deliberation for approval or rejection and the possible implementation into project design by the appropriate parties.
- All waiver requests shall include compelling rationale of functional and operational deviations to include substantiating documentation in sufficient detail for DA to assess implications of approving the waiver.
- All Headquarters, Department of the Army (HQDA) approved exceptions shall be documented in Installation master plans thereby serving as the Installation's modified standards for the ACP affected. Late submissions or project delays are not sufficient stand alone justification for accelerated review or other dispensation to meeting the Army Standard for ACPs contained herein.

Design Guidance:

The Design Guidance section of this Army Standard for ACPs provides instructions and definitions necessary for the application of the mandatory requirements contained in the Army Standard for ACPs. As such, they shall be used in conjunction with the Army Standard for ACPs in order to ensure the intent and embedded functionality will meet the DA's mandatory requirements set forth by this standard. If a difference exists between the tabular section of the Army Standard for ACPs and the design guidance section, the tabular section of the Army Standard for ACPs shall govern.

Standard Design:

The Army Standard Design is published under separate cover providing prescriptive details for design and programming of ACP projects, regardless of funding source. Neither of the documents is intended for standalone use but must instead be used together for the programming and design of Army ACPs. If differences exist between the ACP Standard Design and the ACP Standard, the Army Standard shall govern.

ARMY STANDARD for ACPs
Primary and Secondary ACPs

Item	Primary and Secondary ACP Mandatory Criteria
Gross Area of Facilities	ACP gross area of facilities not to exceed: Shown in Square Feet (SF) VISITOR CONTROL CENTER (VCC): 1. Two processor VCC 900 SF (3) 2. Three processor VCC 2,480 SF 3. Six processor VCC 2,960 SF 4. Nine processor VCC 3,440 SF 5. VCC function of a combined VCC and Search Building 900 SF (3) 6. VCC function of a combined VCC and Command and Control function 900 SF (3) 7. VCC function of a combined VCC, Search Bldg, and Command & Control function 900 SF (3) Note: VCCs larger than two processors may trigger requirement for conformance with UFC 04-010-01 'Minimum AT Standards for Buildings'. GUARD BOOTHS: 1. ID Check Guard Booth 40 SF Note: ID Check Guard Booths used for guards responsible for validation of vehicle driver's credentials shall not be combined with other facilities. 2. Pedestrian Guard Booth 140 SF SEARCH BUILDINGS: 1. Bus Shelter 75 SF 2. Small Search Building 660 SF 3. Large Search Building 1,200 SF 4. Search Building function of a combined VCC and Search Building 75 SF 5. Search Building function of a combined Command & Control function and Search Bldg 75 SF 6. Search Building function of a combined VCC, Search Bldg, and Command. & Control function 75 SF COMMAND & CONTROL / ELECTRICAL and COMMUNICATIONS ROOM: 1. Gatehouse as a standalone building 940 SF (3) 2. Command and Control as a standalone building 530 SF (3) 3. Storage as a standalone building 50 SF

Item	Primary and Secondary ACP Mandatory Criteria
	4. Electrical & Communications Room as a standalone building 530 SF 5. Latrine Facility as a standalone building 110 SF 6. Gatehouse without storage as a standalone building 910 SF (3) 7. Command & Control function of a combined Command & Control Function and Search Bldg 264 SF 8. Command & Control function of a combined Command & Control Function and VCC 264 SF 9. Command & Control function of a combined Command & Control Function, VCC, & Search Bldg 264 SF OVERWATCH BUILDING: 1. Standard Overwatch Building 36 SF 2. Overwatch Building combined with Command & Control Function (No Latrine or Storage) 230 SF NOTES: 1. Gross Area of Facilities GSF (Gross Square Feet) Deviation: Facility constructed gross area shall not exceed 105% of space allocation set forth in this document to accommodate site, construction, or environmental factors. 2. Design projects will fully comply with the Sustainable Design & Development (SDD) policy as stated in Memorandum, ASA (IE&E), Latest edition, Subject: Sustainable Design and Development Update (Environmental and Energy Performance). The programmed amount and square footage will be adjusted by Department of Army after the 3086 review to incorporate energy enhancements to fully comply with the SDD policy. 3. Where unisex facilities are not permitted an additional 110 SF of latrine facility is authorized.
Planning	1. All Installation ACP improvements shall be based either on a Surface Deployment Distribution Command Transportation and Engineering Agency (SDDCTEA) traffic engineering study or a traffic engineering study generated by others that SDDCTEA has validated. 2. All ACP planning shall include coordination with the COS for ACPs. 3. Concepts developed for planning purposes shall include analysis of vehicle turning movements, show primary geometric dimensions and be to scale. 4. Planning shall be conducted to validate ACP requirements and to preclude unsafe off-post queuing of vehicles 5. ACP shall be designed to include queuing to minimize lanes and the number of ID check lanes shall be the minimum required to prevent unsafe off-Installation queuing of vehicles.
Site Selection	1. The appropriate AT/FP stand-off distances shall be in accordance with 'UFC 4-010-01 'Minimum Antiterrorism Standards For Buildings' and shall be incorporated into the design of an ACP. The entire area within the ACP corridor shall be considered to be outside a controlled perimeter. 2. The site selected shall minimize off-Installation impacts.

Item	Primary and Secondary ACP Mandatory Criteria
	3. Capacity and safety limitations of both internal and external road networks shall be considered during site selection.
Traffic Engineering Study	A traffic engineering study shall be performed and completed prior to planning, design or construction of a new ACP or prior to modification of an existing ACP. For the purposes of the traffic engineering study, the term 'modification' shall include, but not be limited to, any of the following: 1. Modifications which include changes to ACP road alignment. 2. Relocation of Identification (ID) Check Area. 3. Projects which include modifications intended to alter ACP traffic volume capacity. The traffic engineering study shall, at a minimum, include the following: 1. Current and proposed peak hour volume for both POVs and commercial vehicles. 2. Current peak hour vehicle search volume for both POVs and commercial vehicles. 3. Current peak hour pedestrian and bicycle volume. 4. Reasonable development of proposed Design Hourly Volume (DHV). 5. ACP capacity impacts caused by intersections or other roadway features prior to the approach zone and immediately after the response zone. Intersections and other roadway features that are located within the approach and response zones shall also be analyzed for traffic volume impacts. 6. Identify the number of ID check lanes associated with Level of Service (LOS) D.
Signage and Marking	All signs and pavement markings will: 1. Be in conformance with state, local and/or host nation criteria. 2. Signs and markings shall comply with all applicable retroreflectivity requirements.
Geometrics	Design roadway in accordance with applicable AASHTO, and/or host nation criteria.
Threat Vehicle	The 4630-pound baseline vehicle threat, as determined by Office of the Provost Marshal General (OPMG) and described in the guidance portion of this Standard and in the Army ACP Standard Design, shall be utilized for all ACP efforts. In addition, the local threat assessment(s) and/or policy shall be reviewed and, if applicable, used to modify the baseline vehicle threat. 1. The threat vehicle utilized shall not be less substantial than the baseline threat vehicle mass established by OPMG unless a waiver, in accordance with AR 420-1, has been requested and approved. 2. The threat vehicle (after incorporation of 'local' threat assessment(s) and policy) shall not be less substantial than the

Item	Primary and Secondary ACP Mandatory Criteria
	baseline threat vehicle mass unless a waiver is acquired 3. Where 'local' threat assessment and/or policy identifies a vehicle with a mass in excess of the OPMG baseline threat vehicle the vehicle with the greater mass will be utilized as the threat vehicle.
Approach Zone	The Approach Zone begins at the ACP entrance and extends to the beginning of the Access Control Zone. It provides an area for incoming vehicles to be sorted and queued.
Entry Gate	Provide an Entry Gate that: 1. Joins with the Installation cantonment perimeter to close off the ACP. 2. Provides equivalent security as the adjoining perimeter barrier/fence/topographic feature; however, is limited in kinetic energy mitigation capacity to a level of 1,200,000 ft-lbs unless a higher level is required by 'local' threat analysis and/or policy.
Passive Vehicle Barriers	Provide Passive Vehicle Barriers that: 1. Tie into the Entry Gate and the Control Zone passive vehicle barriers to form a continuous anti-vehicular corridor. 2. Are capable of defeating the OPMG identified baseline threat vehicle and any vehicle of greater mass identified through mandatory incorporation of all applicable 'local' threat assessments and policy. 3. Are not required to exceed 1,200,000 ft-lbs of kinetic energy in vehicle stopping/mitigation capacity unless a threat vehicle in excess of 15,000 lbs is identified in 'local' threat assessment and/or policy. 4. Are on the DOD anti-ram vehicle barrier list. 5. Comply with all applicable roadside safety criteria.
Visitor Control	Provide the capability to process visitors at each Installation. 1. Installation must be capable of processing the current and projected visitor volume. 2. Visitor processing will be conducted prior to entry into the Installation. 3. If function is combined with the command and control function a physical separation of the two functions is required. 4. Where visitor processing is conducted, non-vetted personnel shall be separated from guard personnel with partition(s), glazing and lockable doors having a ballistic rating equivalent to the requirement for the guard facility exterior. 5. Space utilized for visitor processing must include HVAC in accordance with local climate. 6. The visitor processing area must comply with the required stand-off distance for a building not within a controlled perimeter as per UFC 4-010-01.
Lighting	Provide lighting: 1. In appropriate levels and with appropriate color rendition for

Item	Primary and Secondary ACP Mandatory Criteria
	roadway, parking areas and pedestrian crossings. 2. In appropriate levels and with appropriate color rendition for security areas. 3. That meets the Minimum Maintained Illumination level design objective. 4. With appropriate uniformity. 5. Illumination and color rendition levels will be as prescribed in the Army Access Control Points Standard Design.
Access Control Zone	Provide an Access Control Zone that: 1. Begins at the turn around prior to the ID check and extends to the end of the turn-around immediately after the ID Check Area. 2. Enables guard defeat of all prescribed OPMG threat scenarios which are described in the design guidance section of this Standard.
Passive Vehicle Barriers	Provide Passive Vehicle Barriers that: 1. Tie into the approach zone passive barriers and response zone passive barriers to provide a continuous anti-vehicular corridor. 2. Are capable of defeating the OPMG identified baseline threat vehicle and any vehicle of greater mass identified through mandatory incorporation of all applicable 'local' threat assessments and policy. 3. Are not required to exceed 1,200,000 ft-lbs of kinetic energy in vehicle stopping/mitigation capacity unless a threat vehicle in excess of 15,000 lbs is identified in 'local' threat assessment and/or policy. 4. Are on the DOD anti-ram vehicle barrier list. 5. Comply with all applicable roadside safety criteria.
ID Check Area	Provide an Identification Check Area that: 1. Is established within the Access Control Zone where guards and/or automated equipment validate drivers and vehicle occupant's identifications. 2. Includes a canopy. 3. Includes the number of entry lanes sufficient to process the traffic volume identified in the traffic engineering study. 4. Shall have adequate lighting to support ACP operations. 5. Shall have raised curbed traffic islands to separate all inbound lanes. 6. Shall have one Guard Booth building for each inbound lane, located on the raised curbed traffic island.
ID Check Area Canopy	ID Check Area Canopy Shall: 1. Cover all inbound lanes 2. Be a roof structure supported by columns 3. Not include columns or other features which obstruct more than 11 degrees line of sight for all routinely occupied guard positions. 4. Not impair guards line of sight for critical functions identified in the Army ACP Standard Design.

Item	Primary and Secondary ACP Mandatory Criteria
Turn Arounds	As a minimum, two Turn Around lanes shall be provided with: 1. One located before the ID Check Area 2. One located immediately after the ID Check Area.
Search Area(s)	Provide Vehicle Search Area(s) that: 1. Is located within the Access Control Zone. 2. Has a covered area(s) easily accessible from the ID Check Area. 3. Is sized in accordance with the search volumes identified in an SDDCTEA conducted and/or validated traffic engineering study. 4. Truck and POV search operations may be co-located. 5. If designed for POVs, is accessible for vehicles from the inbound lanes both prior to and after the ID Check Area. 6. Provides shelter for vehicle occupants removed from vehicles during search operations. 7. Includes adequate lighting to support vehicle search operations. 8. May be incorporated into the ID check area as a second lane under the ID check area canopy when projected peak hour traffic volumes are at or below 290 vehicles per hour.
Search Area Canopy	The Search Area Canopy shall: 1. Where commercial vehicles are accommodated, include a Truck Search Area canopy sized to accommodate, at a minimum, one tractor trailer of the largest size allowed on roadways approaching the Installation. 2. Where POVs are allowed, include a POV search area sized to accommodate, at a minimum, one POV.
Guard Facilities	1. ID Check Area shall include a guard booth for each entry lane at the ID check area (unless the ACP includes an OPMG approved automated means that allows a single guard to monitor multiple lanes in which case the number and locations of guard booths shall be in accordance with OPMG identified automation requirements). 2. ID Check guard booths used by guards responsible for validation of vehicle drivers credentials shall provide a 360 degree field of view for occupants. 3. ID Check guard booths used by guards responsible for validation of vehicle drivers credentials cannot be combined with other facilities. 4. ACP shall include a Command and Control functional location which provides guard(s) a clear view (line of sight with augmentation by CCTV where no line of sight exists) of operations in the ID Check Area and of vehicles directed to reject (both from ID Check and Search area). This location shall include an Active Vehicle Barrier (AVB) master control panel. This location will be located in either the Control Zone or the Response Zone. 5. Guard facilities shall include passive barrier protection unless located more than 3' behind the face of a curb or, in the

Item	Primary and Secondary ACP Mandatory Criteria
	absence of a curb, at least 7' from the edge of all traveled vehicle paths. 6. All routinely occupied ACP guard positions and overwatch facility shall be provided ballistic rating of UL 752 level III as a minimum. Ballistic rating shall be increased when warranted by local threat assessment and/or policy. 7. Ballistic rated structures shall be provided with both air conditioning and heating. Capacity of heating and cooling system(s) shall be in accordance with the geographic location.
Control Zone Facilities	Control Zone shall include: 1. Latrine facilities. Latrine facilities shall comply with all applicable building codes and shall be easily accessible from the ID check area. 2. Storage for items routinely utilized at ACP ID Check Areas and Search Areas (e.g. under vehicle mirrors, traffic cones, signs, etc.). 3. Commercial exterior power outlets in close proximity to all locations where routine guard presence is anticipated. 4. An electrical/communications room sized to accommodate all required equipment.
Closed Circuit Television (CCTV) and Electronic Security Systems	1. ACPs shall include infrastructure to support CCTV camera system(s) identified in the Army ACP Standard Design. 2. ACP facilities shall include infrastructure for Electronic Security systems identified in the Army ACP Standard Design.
Automation	Provide infrastructure for automation as prescribed in the Army ACP Standard Design.
Back-Up Power	1. The ACP shall have one or more Uninterruptible Power Supply(s) (UPS) to power critical security and safety loads. 2. UPS shall accommodate lighting for, as a minimum, one fixture for each ID Check Lane located near the guard position and at the AVB(s). 3. The ACP shall have a dedicated back-up generator with automatic start-up and automatic transfer after the normal source of electrical power fails with alternate fuel source and/or sufficient on-site fuel to maintain full-load operation for a minimum of 12 hours.
Lighting	Provide lighting: 1. In appropriate levels, and with appropriate color rendition for roadway, parking areas and pedestrian crossings. 2. In appropriate levels and with appropriate color rendition for security areas. 3. Where identification validation is conducted and locations where searches are conducted shall be provided with lighting appropriate for such procedures. 4. That meets the Minimum Maintained Illumination level design objective. 5. With appropriate uniformity. 6. Illumination and color rendition levels will be as prescribed in the

Item	Primary and Secondary ACP Mandatory Criteria
	Army Access Control Points Standards Design.
Response Zone	Provide a Response Zone that: 1. Begins at the end of the Turn-around immediately after the ID Check Area and extends to the AVBs. 2. Enables guard defeat of all prescribed OPMG threat scenarios which are described in the design guidance section of this Standard.
Passive Vehicle Barriers	Provide Passive Vehicle Barriers that: 1. Tie into the Control Zone passive barriers as well as the AVBs to form a continuous anti-vehicular corridor capable of preventing circumvention or penetration by a vehicle. 2. Are capable of defeating the OPMG identified baseline threat vehicle and any vehicle of greater mass identified through mandatory incorporation of all applicable 'local' threat assessments and policy. 3. Are not required to exceed 1,200,000 ft-lbs of kinetic energy in vehicle stopping/mitigation capacity unless a threat vehicle in excess of 15,000 lbs is identified in 'local' threat assessment and/or policy. 4. Are on the DOD anti-ram vehicle barrier list. 5. Comply with all applicable roadside safety criteria.
AVB Barriers/ AVB Safety System/ AVB Controls System	1. Active Vehicle barriers (AVBs), controlled by ACP guards, shall be installed in all inbound and outbound lanes at the end of the Response Zone to permit or deny vehicle access. 2. AVBs shall be capable of mitigating/defeating the kinetic energy associated with the baseline threat vehicle (or modified threat vehicle if applicable) at the speed and angle achievable prior to impact. 3. The kinetic energy mitigation/defeat capacity of active vehicle barriers is not required to exceed 1,200,000 ft-lbs except where threat vehicles in excess of 15,000 lbs are identified in 'local' threat assessment and/or policy. 4. Active vehicle barrier(s) shall be selected from the DOD anti-ram vehicle barrier list. 5. AVBs deployed in the normally-open operating mode shall have an Emergency-Fast-Operate (EFO) control capability. The EFO shall deploy all AVBs related to the ACP to form a continuous vehicle barrier (with the exception of the entry gate). 6. EFO control of the AVBs shall be provided in the Command and Control Guard functional location, ID Check Guard Booths, Overwatch Position, and the Search Area(s). Actuation of any EFO button shall close all AVBs in all inbound and outbound lanes. 7. Shall include an AVB Safety scheme developed and/or approved by the SDDCTEA. 8. All AVBs that must be deployed in reaction to a perceived threat (normally open) must have a barrier travel time of 2 seconds or less under EFO conditions. 9. AVBs shall include barrier controls in accordance with Unified

Item	Primary and Secondary ACP Mandatory Criteria
	Facility Guide Specification (UFGS) 34 41 26.00 10 "Access Control Points Control System".
AVB Commissioning	AVBs shall be commissioned in accordance with UFGS 34 41 26.00 10 "Access Control Points Control System" by the U.S. Army Corps of Engineers (USACE), Protective Design Mandatory Center of Expertise (PD-MCX) or their designated representative.
Overwatch Position	1. ACP shall have a strategically placed Overwatch Position, which serves as a fighting position, located near (as defined in the Army ACP Standard Design) the AVBs and from which guards are able to assess conditions at the ID Check Area (direct line of sight or augmented by CCTV). 2. The Overwatch shall be either a building with communications, power, and AVB controls, or a paved pad designed to support, at a minimum, one HMMWV. 3. Paved pad overwatch shall also include a pedestal containing a lockable junction box with quick connections to telecommunications, power, and AVB controls. 4. Overwatch building shall be provided ballistic rating of UL 752 level III as a minimum. Ballistic rating shall be increased where warranted by local threat assessment and/or policy. 5. Overwatch building must include a 360 degree field of view for occupants.
Back-Up Power	1. The ACP shall have one or more Uninterruptible Power Supply(s) (UPS) to power critical security and safety loads. 2. UPS shall accommodate lighting for, as a minimum, one fixture at the AVB(s).
Lighting	Provide lighting: 1. In appropriate levels and with appropriate color rendition for roadway, parking areas and pedestrian crossings. 2. In appropriate levels and with appropriate color rendition for security areas. 3. In appropriate levels and with appropriate color rendition for Active Vehicle Barrier location(s). 4. That meets the Minimum Maintained Illumination level design objective. 5. With appropriate uniformity. 6. Illumination and color rendition levels will be as prescribed in the Army Access Control Points Standards Design.
Telecommunications	1. Guards at the Command and Control Guard functional location, Guard Booths, Search Area(s), Overwatch Position, and VCC shall have a minimum of two (2) means of communication with each other and with the Central Security Monitoring Station (if applicable). 2. Telecommunications infrastructure shall meet the (USAISEC) Technical Guide for Installation Information Infrastructure Architecture (I3A) and ANSI/TIA/EIA 568 and 569 requirements. 3. Telecommunications Room(s) (TR) shall be provided for the voice and data network associated with the ACP.

Item	Primary and Secondary ACP Mandatory Criteria
Information Connectivity & Distribution	1. The Command and Control Guard functional location, ID Check Guard Booths, VCC, Overwatch Position permanent building and Search Area Building (when included and utilized to process drivers) shall include counters, LAN connections, and all other infrastructure necessary for computer and communications equipment identified in the Army ACP Standard Design. 2. Outside plant connectivity shall be In accordance with DA I3A guidance.
Energy Policy	ACP shall comply with all energy policy requirements.
Sustainable Design Development	All ACP components shall be designed to meet current sustainable development and design policy requirements as established by the DA.
Accessibility	1. The VCC and Search Area Building (where utilized) shall comply with all requirements contained in applicable accessibility documents. 2. The public portion of combined facilities and other ACP buildings intended for public use shall also comply with applicable accessibility documents.

ARMY STANDARD for ACPs
Limited Use ACPs

Item	Limited Use ACP Mandatory Criteria
Planning	Planning: 1. An analysis of traffic needs shall be conducted to validate requirements and to preclude unsafe off-post queuing of vehicles. 2. No formal Traffic Engineering Study required.
Site Selection	The appropriate Anti-Terrorism/Force Protection (AT/FP) stand-off distances shall be in accordance with 'UFC 4-010-01 'Minimum Antiterrorism Standards For Buildings' and shall be incorporated into the design of an ACP. The entire area within the ACP corridor shall be considered to be outside a controlled perimeter.
Approach Zone	The Approach Zone begins at the ACP entrance and extends to the beginning of the Access Control Zone. It provides an area for incoming vehicles to be sorted and queued.
Entry Gate	1. Has an Entry Gate to close off the ACP at the Installation perimeter. 2. Entry Gate shall adjoin to and provide equivalent security as the

Item	Limited Use ACP Mandatory Criteria
	adjoining perimeter barrier/fence; however, it is not required to exceed a kinetic energy mitigation capacity of 1,200,000 ft-lbs unless required by 'local' threat analysis and/or policy.
Passive Vehicle Barriers	Provide Passive Vehicle Barriers and/or operational procedures that are capable of defeating or enabling defeat of the OPMG identified baseline threat vehicle and any vehicle of greater mass identified through incorporation of all applicable 'local' threat assessments and policy.
Lighting	Provide lighting in appropriate levels: 1. For the safety of drivers, pedestrians and guards via permanent or temporary measures when ACP is operational. 2. And with appropriate color rendition for security areas via permanent or temporary measures when ACP is operational.
Access Control Zone	Provide an Access Control Zone that begins at the turn around prior to the ID check and extends to the end of the turn-around immediately after the ID Check Area.
Passive Vehicle Barriers	Provide Passive Vehicle Barriers and/or operational procedure that are capable of defeating or enabling defeat of the OPMG identified baseline threat vehicle and any vehicle of greater mass identified through mandatory incorporation of all applicable 'local' threat assessments and policy.
Identification Check Area	Provide an Identification Check Area that: 1. Is established within the Access Control Zone where guards or automated equipment verify pedestrians, vehicles, and vehicular occupant's identifications; direct vehicles to other areas of the ACP; and validate authorizations to enter the installation. 2. Has adequate lighting to support validation of credentials and other ACP operations.
Search Area(s)	Provide a Search Area that: 1. Is of sufficient size to process designated vehicles 2. Is located in the Access Control Zone
Guard Facilities	ACP guards conducting validation of credentials shall be protected from errant vehicle impact.
Lighting	Provide lighting: 1. In appropriate levels for the safety of drivers, pedestrians and guards 2. In appropriate levels and with appropriate color rendition for security areas.
Response Zone	Provide a Response Zone that enables guard defeat of all prescribed OPMG threat scenarios.
Passive Vehicle Barriers	Provide Passive Vehicle Barrier System and/or Operational Procedure that: 1. Is capable of defeating or enabling defeat of the OPMG identified baseline threat vehicle and any vehicle of greater mass identified

Item	Limited Use ACP Mandatory Criteria
	through mandatory incorporation of all applicable 'local' threat assessments and policy. 2. Where utilized, passive vehicle barriers are not required to exceed 1,200,000 ft-lbs of kinetic energy in vehicle stopping/mitigation capacity unless a threat vehicle in excess of 15,000 lbs is identified in 'local' threat assessment and/or policy.
AVB Barriers/ AVB Safety System/ AVB Controls System	Provide Active Vehicle Barrier System and/or Operational Procedure that is capable of defeating or enabling defeat of the OPMG identified baseline threat vehicle and any additional threat vehicles identified through incorporation of all applicable 'local' threat assessments and policy.
AVB Commissioning	When AVBs are utilized they shall be commissioned in accordance with UFGS 34 41 26.00 10 "Access Control Points Control System" with oversight by the U.S. Army Corps of Engineers (USACE), Protective Design Mandatory Center of Expertise (PD-MCX).
Overwatch Position	ACP shall have a strategically placed Overwatch Position, located near the AVBs but within sight of the ID Check Area.
Telecommunications	Guards shall have a minimum of two (2) means of communication.
Energy Policy	ACP shall comply with all energy policy requirements.

ARMY STANDARD for ACPs
Pedestrian ACPs

Item	Pedestrian ACP Mandatory Criteria
Pedestrian Access	Pedestrian ACPs shall utilize guard personnel and/or automated access equipment (where applicable) to safely permit or deny entry while maximizing pedestrian throughput. Pedestrian ACPs shall provide: 1. Passive Pedestrian Barriers and Active Pedestrian Barriers arranged to form a contiguous perimeter. 2. An ID Check Area where the guards or automated equipment validate credentials. 3. A ballistic rated guard location with, as a minimum, a 180 degree field of view If guards are utilized at the ACP for validation of credentials. Where automated means are utilized and guard participation is remote no guard booth is required. 4. Security and safety lighting in conformance with local, state, federal and/or applicable host nation criteria. 5. Pedestrian safety features in accordance with all applicable standards. 6. Accessibility in conformance with all applicable criteria.

DESIGN GUIDANCE SECTION

Facility Category Code: No unique Category Code exists for Access Control Points. A complete and usable ACP includes the following:

CATEGORY CODE	DESCRIPTION
14113	Access Control Building (entrance control posts, guard and watchtowers, sentry stations, area to conduct personnel identification and visitor control. This CATCD is for buildings (enclosed); for open-sided structures use 14179, Overhead Protection.
14179	Overhead Protection
87210	Fencing & Walls
87250	Entrance Gates

General:

The following guidance for application of the Army Standard for ACPs is provided for design agent use in coordination with the Garrison and associated Directorates. All design agents shall incorporate the mandatory design features described herein in close coordination with the USACE designated Center of Standardization (COS) for ACPs. All ACP projects must be reviewed by the COS.

Compliance Threshold:

The Army Standards (AS) may identify an Army regulation, technical guide or other written guidance as mandatory criteria. The COS provides the first line technical compliance review. The FDT, in conjunction with the COS, will resolve any issues where there may be conflicting, unclear, or no compliance measurement threshold. Resolution may require senior leadership guidance or amendment of the AS. Only the ACSIM may approve adjustments or changes to the requirements in an AS. The AS is not intended to provide compliance criteria detailed in references, regulations, industry standards, or standard design.

Citing project execution delays is insufficient justification for expedited review or other accelerated dispensation for deviating from meeting the Army Standard for ACPs contained herein. Late submissions must be substantiated by unforeseen and documented life safety, health and welfare, or compelling mission imperatives that cannot be met without an approved waiver.

Definitions:

Installation: The definition of Installation is as found in AR 420-1

Primary ACP: Operates 24 hours per day during weekdays. These are often open 24 hours per day during weekends as well; however, weekend operation is not required for an ACP to be construed as 'Primary'.

Secondary ACP: Operates during regular hours but less than 24 hours per day.

Limited Use ACP: Operates only for special purposes or special events. ACPs open for scheduled hours (even if not daily) are not to be considered Limited Use.

Approach Zone: The Approach Zone provides an area for incoming vehicles to be sorted and queued. This zone may include visitor control and traffic calming measures.

Access Control Zone: Vehicle occupants and pedestrian ID validation are validated within this zone. Vehicle and/or pedestrian searches are also done within this zone. This zone includes the turn-arounds before and after the ID check area.

Response Zone: This zone extends from the final turn-around to the active vehicle barriers. Overwatch capability is included in this zone.

CONUS: Continental United States. Used to describe the 48 contiguous U.S. States.

OCONUS: Outside Continental United States. Any location other than the 48 continental U.S. States.

FDT: Facility Design Team. The AFSC establishes an FDT for each facility type, or group of facility types, to be standardized. Specific working teams may be established as necessary within each team to address specific elements, or geographical and regional variations of the facility type.

AFSC: Army Facilities Standardization Committee. The AFSC is responsible for the overall Army Facilities Standardization program. It directs the activities of the Facility Design Group (FDG), the Technology Standards Group, and the various Design Teams that develop and recommend the Army Standards and Standard Design/Criteria.

Design Hourly Volume: A design hourly volume (DHV) is the calculated volume or number of vehicles passing over a point in an hour. The DHV would be used for design purposes to accommodate variations in traffic volume and expected growth or decline in traffic volumes. Although a design hourly volume (DHV) of traffic is commonly related to the thirtieth highest hourly traffic volume for the design year, if less data is available it is prudent to derive a DHV based on a measured peak hourly volume, taking into account periods within an hour of higher rates of traffic flow, and possible growth for the design life of a project.

Peak Hour Volume: A peak hourly volume is the volume or number of vehicles passing over a point in the busiest hour within a peak period. A day may have several peak periods, such as a morning, noon, and afternoon peak.

Contact Information:

SDDCTEA website: http://www.tea.army.mil/DODProg/TE/default.htm

COS for ACPs website: http://mrsi.usace.army.mil/cos/SitePages/Home.aspx

Description:

An ACP provides the first physical security boundary layer that restricts access to Department of Army (DA) Installations and real property through centralized perimeter and access controls. The ACP also provides the appropriate vehicular and pedestrian throughput, to prevent vehicles from queuing in an unsafe manner. All functions of the ACP must meet applicable safety standards. The AVB system must perform in accordance with the applicable safety schemes. Also, the perimeter of the ACP will consist of both passive and active barriers arranged to form a continuous barrier to pedestrians and/or vehicles. ACP guards control the active pedestrian and vehicle barriers to deny or permit entry into the Installation.

ACP Classifications:

Department of the Army ACP classifications are: (a) Primary, (b) Secondary, (c) Limited Use, and (d) Pedestrian. Primary and Secondary ACPs can accommodate POVs, trucks, pedestrians or any combination thereof. There are only operational differences between a Primary and a Secondary ACP. Limited Use ACPs are only open for non-routine and non-predicable special purposes and special events. Primary and Secondary ACPs shall provide the means to defeat the vehicle and/or pedestrian threat via permanent measure defined in this Army Standard for ACPs. Limited Use ACPs shall provide a means to defeat the vehicle and/or pedestrian threats via temporary and/or permanent physical measures and/or operational procedure. A Pedestrian ACP can be part of an ACP that accommodates other vehicles or it can be standalone.

Design Philosophy:

The ACP is a complex combination of force protection and traffic control elements. It must enable defeat of identified OPMG threat scenarios while allowing throughput in accordance with the demand identified in the Traffic Engineering Study, and it must do so while providing safe conditions for vehicle occupants, guards and pedestrians. The Traffic Engineering Study is critical to the design of an ACP. The TES provides the data the designer uses to size many of the components of an ACP.

The adaptation of these Standards to a specific site is a complicated process. Requirements related to the defeat of threats may seem to contradict requirements for throughput and/or safety; they do not. Each category of requirement (security, safety, and throughput) must not be looked at individually but must rather be considered part of a system.

The amount of land necessary for an ACP can be considerable. The land must be sufficient to meet the requirements contained in this Standard as well as requirements contained in UFC 4-010-01 'Minimum AT Standards For Buildings'. It is important to note that the basis for standoff for 'occupied' buildings within the ACP and for those buildings adjacent to the ACP must be 'parking and roadways without a controlled perimeter'. The boundaries of the ACP corridor are considered to be the controlled perimeter for these purposes.

Key Points about Army Standard ACPs:

1. The ACP is designed and constructed to comply with the Army Standard and Standard Design for ACPs.
2. Manpower efficiency has been considered during the development of these Standards. Site adaptation of the ACP should always include an evaluation of manpower constraints and requirements.
3. The Standards are not dependent upon the existence of Installation perimeter vehicle barriers, fencing or other security measures.

Planning:

1. Involvement of the U.S. Army Corps of Engineers Center of Standardization (COS) for ACPs in the planning process is essential. The incorrect programming of ACP projects has been prevalent in those situations where the COS has not been involved prior to submittal of programming documents.
2. A review of 'local' threat assessment and policy will be conducted prior to the programming and/or design of an ACP.
3. A Traffic Engineering Study that specifically addresses ACP requirements is necessary prior to the development of programming documents. The TES must be conducted or validated by the SDDCTEA before it can be utilized for the planning, design or construction of an ACP. The size of many ACP features must be based on the traffic volumes identified in the TES. The TES process can take a year to conduct so plan accordingly.
4. Vehicle Threat Scenarios. ACPs shall be designed to defeat all identified OPMG vehicle threat scenarios. Additional vehicle threat scenarios shall be defeated when required by a 'local' threat assessment or policy.
5. A baseline threat vehicle and a set of baseline threat scenarios is provided by OPMG. All applicable 'local' threat assessment and/or policies must be reviewed and utilized to modify the prescribed baseline threat. No waiver is required for the addition of threat scenarios or adding to the mass of the threat vehicle. Waivers will be required for any reduction of the baseline threat or any of the threat scenarios.
6. ACP shall be capable of processing the expected traffic types, which may include: tractor-trailer trucks, POVs, official DOD Vehicles, tactical vehicles, pedestrians and bicycles.
7. Guard reaction time shall be three (3) seconds for threat scenarios where there has been no notice to guard personnel that a specific vehicle has been identified for a specific action. Guard reaction time shall be one (1) second for situations where guard personnel have been notified of a specific action to be taken by an identified vehicle and guard personnel have had time to prepare for activation of the AVBs.
8. Vehicle Threat Scenario calculations, and corresponding vehicle threat paths, shall be conducted to verify that the AVBs are located where defeat is possible for the shortest timed path of travel through the ACP for each Threat Scenarios.

Threat Scenarios:

OPMG Vehicle Threat Scenarios. ACPs shall be designed to defeat the following four minimum vehicle threat scenarios. Additional vehicle threat scenarios shall be included if required by a local threat assessment.

1. Vehicle Threat Scenario #1. Threat vehicle enters the ACP in the inbound or outbound lane(s) at the maximum speed attainable at the ACP entrance and then immediately accelerates at its maximum acceleration rate through the ACP.
2. Vehicle Threat Scenario #2. Threat vehicle enters the ACP in the inbound or outbound lane(s) at or under the posted ACP Speed Limit and then, later at some point further in the Approach Zone, accelerates at its maximum acceleration rate through the rest of the ACP.
3. Vehicle Threat Scenario #3. Threat vehicle feigns compliance and stops in lane. The guard detects threat behavior or criminal status through observation or electronic means and moves to guard booth to initiate denial process. Threat vehicle occupants attempt to force entry (tactics include potential use of direct fire weapons and acceleration through the ACP).
4. Vehicle Threat Scenario #4. Similar to Threat Scenario 3 above, except the driver of the denied vehicle drives toward the Turn-around or Search Area at the ACP Speed Limit as if complying with guard instructions, but then fails to turn and instead accelerates at its maximum acceleration rate

Threat Vehicle:

1. The baseline threat vehicle shall be a large passenger car as defined in ASTM F2656. The mass of the baseline threat vehicle is 4630 pounds.
2. Other threat vehicle characteristics and capabilities are located in the Army ACP Standard Design.

Site Selection:

1. The site selected must be suitable for conformance with these Standards. Modifications to adjacent facilities, relocation of intersecting roadways and other features may be necessary. Future facility locations identified in Master Planning documents must be considered and adjusted where conflicts are identified.

AVB Barriers/ AVB Safety Systems/ AVB Controls Systems:

1. AVBs, controlled by ACP guards shall be installed in all inbound and outbound lanes at the end of the Response Zone to permit or deny vehicle access.
2. Only SDDCTEA established AVB safety schemes shall be used.
3. Normally open AVB systems will include EFO controls. When pushed, an EFO will result in the deployment of all open AVBs and will result in the locking in place of all AVBs already deployed at the time of EFO activation. Barrier deployment shall not take place until the time identified for the SDDCTEA safety scheme used.
4. The SDDCTEA AVB safety scheme utilized must be based on throughput as well as Installation needs and preferences. Some safety regimes place additional restrictions on throughput and could be perceived as being unduly inconvenient by drivers or other Installation personnel. Where adequate space exists, the default safety scheme should be 'Signs and Signals'.

AVB Commissioning:

AVBs shall be commissioned in accordance with Unified Facility Guide Specification (UFGS) 34 41 26.00 10 "Access Control Points Control System" by the U.S. Army Corps

of Engineers Protective Design Center (USACE, PD-MCX) or their designated representative.

Approach Zone:

1. The Approach Zone begins at the ACP entrance and proceeds to the beginning of the vehicle Turn-around immediately prior to the ID Check Area.
2. Provide an area for incoming vehicles to be sorted and queued.
3. The VCC can be in either the Approach or Access Control Zones. However, the processing of visitors must be accomplished prior to the ID check area.
4. The aesthetic treatment of the entry gate should be consistent with the adjoining perimeter barrier fencing.

Access Control Zone:

1. The Access Control Zone is located between the Approach Zone and the Response Zone.
2. The access control zone includes both the ID Check Area and all the Search Areas. It is within this Zone that credentials of vehicle drivers and pedestrians are validated and vehicles are searched.

Response Zone:

1. The Response Zone starts from the end of the Turn-around immediately after the ID Check Area and continues to the AVBs.
2. It is completely contained by AVBs and Passive Barriers.
3. The Response zone includes AVBs, controlled by ACP guards, which shall be installed in all inbound lanes at the end of the Response Zone and all outbound lanes at the end of the Response Zone to permit or deny vehicle access.
4. It has an Overwatch that shall be located near the AVBs but within sight of the ID Check Area. If conditions are such that the overwatch guard is not able to view operations in the Access Control Zone, augmentation of view through use of CCTV can be used to mitigate deficiencies.

Command and Control Guard functional location:

1. A Command and Control Guard functional location will be provided at each ACP. This location will be located in either the Access Control Zone or the Response Zone. A guard in this location will be able to assess conditions in the Control Zone (to include ID Check Area, Search Area, turn-arounds and rejections). Locaion will be provided with controls for the Active Vehicle Barriers as well as augmentation, where necessary, to ensure guards ability to assess aforementioned areas.
2. The ballistic rating of this location, as with all other ACP guard facilities, must be modified when a rating above UL 752 level III is identified in 'local' threat analysis and/or policy. Applicable analysis/policy shall be sufficient justification for a higher ballistic rating. A lower ballistic rating, even where identified by such analysis/policy shall require a waiver.

Overwatch Position:

1. Each Installation ACP shall have a strategically placed Overwatch Position, which serves as a fighting position. It will be located near the AVBs but within sight (either direct view or with augmentation by CCTV) of the ID Check Area. The Overwatch shall be either a building with communications, power, and AVB controls, or a paved pad with a pedestal containing a lockable junction box containing quick connections for communications, power and AVB controls. The paved pad will be designed to support, as a minimum, one HMMWV.
2. The ballistic rating of this structure, as with all other ACP guard facilities, must be modified in accordance with all 'local' threat analysis and/or policy. Directly applicable analysis/policy shall be sufficient justification for a higher ballistic rating. A lower ballistic rating, even where identified by such analysis/policy shall require a waiver.

HVAC for Ballistic Rated Structures:

1. The requirement for both Air Conditioning and Heating is essential for a ballistic rated structure to function as intended. Ballistic rated structures do not provide significant opportunity to cool through use of open windows or other methods of fresh air ventilation.

Visitor Control Center (VCC):

1. Each Installation must have at least one VCC.
2. The VCC must be located outside the point at which vetting of personnel occurs.
3. Access to and egress from the VCC must not be such that it provides bypass of the ID check area.

Pedestrian Access:

1. Pedestrian ACPs shall safely convey/pass personnel, prevent unauthorized entry and process the pedestrian volume identified in the Traffic Engineering Study.

Back-Up Power:

1. The ACP shall have one or UPS to power critical security and safety loads during an interruption in electrical service.
2. The following loads shall be on UPS:
    - Primary communications system
    - Duress alarm system
    - Computers
    - CCTV systems
    - Intrusion Detection Systems (IDS)
    - Prescribed Lighting, Traffic signals and warning devices
    - AVB controls
    - AVB activation system for one complete cycle (open to close and close to open), and all equipment associated with the AVB safety scheme

    Lighting levels and other details can be found in the Army ACP Standards Design.
3. The ACP shall have a dedicated back-up generator with automatic start-up and automatic transfer after the normal source of electrical power fails and shall have an

alternate fuel source (e.g. natural gas) or sufficient on-site fuel to maintain full-load operation for a minimum of 12 hours.

4. The following loads shall be on Back-up Power:
    - Interior lighting for the Command and Control functional location, Guard Booths, Overwatch position, and Search Area Building
    - Canopy lighting in prescribed levels at the ID Check and Search Area(s)
    - External lighting in prescribed levels for the Access Control Area from and including the turn-arounds before and immediately after the ID check area.
    - External lighting in prescribed levels for 50' of Approach Zone and Response Zone lighting prior to the turn-around before and immediately after the ID Check Area
    - External lighting, in prescribed levels within 50 feet on both sides of the AVBs; and all items on Uninterruptible Power Supply(s) (UPS).

Lighting levels and other details can be found in the Army ACP Standards Design.

Remainder of Army ACP Standards:

No further discussion is offered for the remainder of the Standards.

Reference Criteria: Use the latest editions of the following criteria for design of the Access Control Point:

- American with Disabilities Act and Architectural Barriers Act Accessibility Guidelines
- ANSI/TIA/EIA-568-B Commercial Building Telecommunications Cabling Standard
- ANSI/TIA/EIA-568-B Commercial Building Standard for Telecommunications Pathways and Spaces
- ANSI/TIA/EIA 569
- AR 55-80 DOD Transportation Engineering Program
- AR 190-13, The Army Physical Security Program
- AR 405-70, Utilization of Real Property
- AR 420-1, Army Facilities Management
- ASHRAE 189.1, Standard for the Design of High-Performance Green Buildings
- ASTM F-2656 Standard for impact testing of anti-ram vehicle barriers
- ETL 1110-3-491, Sustainable Design for Military Facilities
- Memorandum, ASA (IE&E), 27 Oct 10, Subject: Sustainable Design and Development Update (Environmental and Energy Performance)
- SDDC-TEA Pamphlet 55-15
- UFC 1-200-01, General Building Requirements
- UFC 3-600-01, Design: Fire Protection Engineering for Facilities
- UFC 4-010-01, DoD Minimum Antiterrorism Standards for Buildings
- UFC 4-023-03, Security Engineering: Design to Resist Progressive Collapse
- Unified Facility Guide Specification (UFGS) 34 41 26.00 10 "Access Control Points Control System"
- USAISEC Technical Guide for Installation Information Infrastructure Architecture (I3A)
- USAISEC Technical Guide for the Integration of SECRET Internet Protocol (IP) Router Network (SIPRNET)

APPENDIX M
ORIGINAL PLANNING CHARRETTE DD1391S

Pine Bluff Arsenal
Arkansas Access Control Point - Plainview

141 13 62817 16,000

PRIMARY FACILITY				11,234
Gatehouse	SF	940	1,006	(946)
Visitor Control Center	SF	5,000	823.49	(4,117)
Search Shelter, 5' x 10'	EA	1	8,715	(9)
ID Check Guard Booth	EA	2	79,165	(158)
Overwatch Guard Booth	SF	49	2,703	(132)
Total from Continuation page(s)				(5,872)
SUPPORTING FACILITIES				2,988
Electric Service	LS	--	--	(1,066)
Water, Sewer, Gas	LS	--	--	(472)
Paving, Walks, Curbs And Gutters	LS	--	--	(190)
Storm Drainage	LS	--	--	(203)
Site Imp(308) Demo(94)	LS	--	--	(402)
Information Systems	LS	--	--	(79)
Antiterrorism Measures	LS	--	--	(576)

ESTIMATED CONTRACT COST	14,222
CONTINGENCY (5.00%)	711
SUBTOTAL	14,933
SUPERVISION, INSPECTION & OVERHEAD (6.50%)	971
TOTAL REQUEST	15,904
TOTAL REQUEST (ROUNDED)	16,000
INSTALLED EQT-OTHER APPROPRIATIONS	(283)

Construct a standard design Access Control Point (ACP) and Commercial Vehicle Inspection Point. Project includes a Visitor Control Center, Gatehouse, vehicle inspection canopy, guard booths, ID check canopy, search area pedestrian shelter, roadways, parking, lighting, traffic control signals, passive and active vehicle barriers with comprehensive control systems, information systems, fire protection and alarm systems, Intrusion Detection System (IDS) installation, Cybersecurity Measures, and Energy Monitoring Control Systems (EMCS) connection. Visitor Control Center includes additional costs for antiterrorism and tornado shelter hardening requirements to protect staff and visitors. Sustainability and energy enhancement measures are included. Supporting facilities include site development, utilities and connections, site lighting, paving, parking, walks, curbs and gutters, storm drainage, information systems, landscaping and signage. Heating and air conditioning will be provided by self-contained system. Measures in accordance with the Department of Defense (DoD) Minimum Antiterrorism for Buildings standards will be provided. Comprehensive building and furnishings related interior design services are required. Access for individuals with disabilities will be provided. Since this facility type has not been constructed in several years, the OSD Unit Cost does not include Building Information Systems cost. Facilities will be designed to a minimum life of 40 years in accordance with DoD's Unified Facilities Criteria (UFC 1-200-02) including energy efficiencies, building envelope and integrated building systems performance. Demolish 5 buildings at Pine Bluff Arsenal, AR (1,367 Total SF). Air Conditioning (Estimated 15 Tons).

Pine Bluff Arsenal
Arkansas

Access Control Point - Plainview 62817

9. COST ESTIMATES (CONTINUED)

ITEM	UM	QUANTITY	UNIT COST	COST ($000)
PRIMARY FACILITY (CONTINUED)				
I.D. Check Area Canopy	SF	3,150	198.40	(625)
Truck & POV Search Canopy	SF	4,060	194.69	(790)
Active Vehicle Barrier	EA	2	358,471	(717)
Cybersecurity Measures	LS	--	--	(959)
ID Check, Search Pavement	SY	15,350	77.27	(1,186)
Passive Vehicle Barrier	LS	--	--	(849)
ACP Equipment	LS	--	--	(115)
Standby Generator, Nat. Gas, w/ ATS	EA	1	99,539	(100)
Vehicle Scales (Truck)	EA	2	89,550	(179)
IDS/Duress Alarm Installation	LS	--	--	(102)
CCTV Installation	LS	--	--	(169)
Sustainability/Energy Measures	LS	--	--	(66)
Building Information Systems	LS	--	--	(15)
			Total	5,872

11. REQ: 8,797 SF ADQT: 5,551 SF SUBSTD: 3,246 SF

PROJECT:
Construct a Primary Access Control Point at Plainview Gate, Pine Bluff Army Arsenal. (Current Mission)

REQUIREMENT:
This project is required to provide safe and secure access at the Plain View Gate entrance into Pine Bluff Arsenal (PBA). Plainview Gate is the primary entrance into Pine Bluff Arsenal. The Gate's one inbound and outbound lanes require modification to expedite vehicle security measures. An Access Control Point Study conducted in 2018 by the Military Surface Deployment and Distribution Command, Transportation Engineering Agency, determined that the Plainview Access Control Point requires two new entrance access lanes and one exit access lane with a commercial inspection point to provide secure and efficient traffic flow. The facility will become the primary gate to Pine Bluff Army Arsenal that must be able to handle 636 privately owned vehicles per day and provide 50 commercial truck inspections per day to support the Army Joint Munitions Command and have the ability to closely monitor and inspect all traffic that enters the installation through this gate. Visitor control Center will require connection to stand-by back-up power to allow commercial vehicle processing during a power outage to prevent delays in shipping and receiving of materials. Visitor Control Center (VCC) is larger than Standard VCC drawings to provide for additional staff supporting commercial truck processing and Quality Assurance Specialist Ammunition Surveillance (QASAS) inspections required at PBA.

CURRENT SITUATION:
Plainview Gate Entrance serves as the primary entrance into Pine Bluff Arsenal. It

Pine Bluff Arsenal
Arkansas

Access Control Point - Plainview 62817

CURRENT SITUATION: (CONTINUED)
is the only entrance that has an overpass over the adjacent railroad tracks. The other two entries have at grade railroad crossings that present safety issues when vehicular traffic is heavy. This is especially true with commercial truck traffic at Dexter Gate. This safety issue will be alleviated by moving all commercial traffic to Plainview. Currently, the ACP has only one entrance and one-exit lane. There is no location to perform thorough searches of vehicles prior to their entrance onto the installation. Vehicles are allowed to pass through the gate and directed to a side road for any inspections. Portable generator light sets are used for the inspections. During periods in which the installation operates at Force Protection Level Delta, and when commercial trunk traffic is heavy, the current configuration of the entrance gates allows traffic at Dexter Gate (current commercial gate) to back up beyond the reservation boundary across the at-grade railroad crossing and to the intersection with Arkansas State Highway 65. Because the railroad tracks parallel the base boundary there is limited real estate between the tracks and the ACP severely restricting a feasible solution compliant with UFC 4-011-02 at Dexter Gate. Also, the 1940's construction of the Plainview ACP buildings provides little protection for PBA Security personnel.

IMPACT IF NOT PROVIDED:
If this project is not provided, one of the major entrances to Pine Bluff Arsenal will not comply with Unified Facilities Criteria (UFC 4-011-02) Security Engineering: Entry control Facilities/Access Control Points. During periods when the installation is operating under Force Protection Level Delta conditions, and when commercial truck traffic is heavy, there will continue to be long lines of traffic that will extend from the gate to the intersection with Arkansas State Highway 65 impacting the local community traffic patterns and risking accidents at the railroad crossing. PBA Security personnel will continue to be at increased risk.

ADDITIONAL:
All required physical security and antiterrorism/force protection measures will be incorporated. Sustainable principles will be integrated into the development, design, and construction of the project. Joint use potential will be incorporated where feasible. Provisions will be made for persons with disabilities if applicable. An Economic Analysis is not necessary for this project. All potential alternatives were examined in the development of the project and none were found to be feasible. RPLANS sets the Allowance='0' for this Category Code, 14113. Required assessments have been made for supporting facilities and the project is not in a 100-year floodplain in-accordance-with Executive Order 11988. This project has been coordinated with the installation physical security plan, and all physical security measures are included. All required antiterrorism protection measures are included. Alternative methods of meeting this requirement have been explored during project development. This project is the only feasible option to meet the requirement. The Deputy Assistant Secretary of the Army (Installations, Housing and Partnerships) certifies that this project has been considered for joint use potential. The facility will be available for use by other components. Sustainable principles, to include life cycle cost effective practices, will be

Pine Bluff Arsenal
Arkansas

Access Control Point - Plainview 62817

ADDITIONAL: (CONTINUED)
integrated into the design, development and construction of the project and will follow the guidance detailed in the Army Sustainable Design and Development Policy - complying with applicable laws and executive orders.

/S/ ROCH J. BYRNE

Deputy to the Commander

ESTIMATED CONSTRUCTION START:	MAR 2029	INDEX: 3608
ESTIMATED MIDPOINT OF CONSTRUCTION:	SEP 2029	INDEX: 3644
ESTIMATED CONSTRUCTION COMPLETION:	MAR 2030	INDEX: 3681

Pine Bluff Arsenal
Arkansas

Access Control Point - Plainview 62817

		Item	U/M	Qty	Unit Cost	Cost ($000)
PRIMARY FACILITY.						
GENERAL.						
1.0)	14113	Gatehouse	SF	940	1,006.34	(946)
2.0)	14113	Visitor Control Center	SF	5,000	823.49	(4,117)
1)	14113	Visitors Control Center	SF	5,000	549.00	2,745
2)		Tornado Shelter Hardening (ICC 500)	SF	5,000	274.49	1,372
3.0)	14113	Search Shelter, 5' x 10'	EA	1	8,715.40	(9)
4.0)	14113	ID Check Guard Booth	EA	2	79,165	(158)
5.0)	14113	Overwatch Guard Booth	SF	49	2,702.76	(132)
6.0)	14113	I.D. Check Area Canopy	SF	3,150	198.40	(625)
7.0)	14113	Truck & POV Search Canopy	SF	4,060	194.69	(790)
8.0)	88040	Active Vehicle Barrier	EA	2	358,471	(717)
1)		AVB w/ Emergency Fast Operation	EA	2	255,444	511
2)		Control System	EA	1	17,843	18
3)		AVB Signals	EA	2	89,885	180
4)		Loop detector	LF	660	12.79	8
9.0)	00000	Cybersecurity Measures	LS	--	--	(959)
1)		Cybersecurity - FLS	LS	--	--	320
2)		Cybersecurity - EMCS	LS	--	--	320
3)		Cybersecurity - ESS	LS	--	--	320
10.0)	85110	ID Check, Search Pavement	SY	15,350	77.27	(1,186)
1)	85110	Concrete Pavement, 8" Unreinforced	SY	15,350	58.47	898
2)	85110	Base Course 1-1/2" Crushed Stone to 6" De	SY	15,350	13.15	202
3)	93410	Raw Subgrade Compaction, 6" deep	CY	2,558	11.12	28
4)	85110	CIP Curb & Gutter 12" HI, 6" THK, 24" wide	LF	1,391	41.90	58
11.0)	88042	Passive Vehicle Barrier	LS	--	--	(849)
1)		K12 rated cable system w/ FE6 fence	LF	2,120	397.28	842
2)	87250	Chain Link DS Gate 32'w, 8'h, K-4 FE6	EA	2	3,179.65	6
12.0)	14113	ACP Equipment	LS	--	--	(115)
1)		Point Overspeed Detection	EA	3	12,009	36
2)		Wrong Way Detection	EA	2	12,009	24
3)		Continuous Overspeed Detection	EA	2	27,450	55
13.0)	81160	Standby Generator, Nat. Gas, w/ ATS	EA	1	99,539	(100)
1)	81160	Standby Generator 125 kW	EA	1	99,539	100
14.0)	14971	Vehicle Scales (Truck)	EA	2	89,549	(179)
15.0)	00000	IDS/Duress Alarm Installation	LS	--	--	(102)
16.0)	00000	CCTV Installation	LS	--	--	(169)

Pine Bluff Arsenal
Arkansas

Access Control Point - Plainview 62817

		Item	U/M	Qty	Unit Cost	Cost ($000)
1)	81230	20' Aluminum Pole for Cameras	EA	8	4,907.00	39
2)	81242	Underground Hand Holes, 4' x 4' x 4'	EA	10	3,911.94	39
3)	81242	Underground Conduit, 2-Way 4in PVC w/ cabl	LF	2,000	45.52	91
17.0)	00005	Sustainability/Energy Measures	LS	--	--	(66)
1)		Sustainability/Energy Measures	LS	--	--	66
INFORMATION SYSTEMS.						
1.0)	80800	Building Information Systems	LS	--	--	(15)
SUPPORTING FACILITIES.						
Electric Service			LS	--	--	(1,066)
1)		Aerial, 3-#6 AAAC 15kv, 1-#4 AAAC 600V N	FT	7,000	65.05	455
2)	81242	UG Lines, Conc encased 2-Way 4" PVC Condui	LF	250	47.89	12
3)		UG Line, 4-#3/0	LF	250	61.46	15
4)	81242	Electric Manholes, 6' x 10' x 7' deep	EA	1	17,350	17
5)		45 ft Class 3 Steel Pole	EA	5	8,649.53	43
6)	81360	Transformers 100 kVA, Oil Filled, Pad Mtd	EA	1	27,171	27
7)		10kV Pole Mtd Surge Arrestor	EA	1	8,497.18	8
8)		15kV Pole Mtd Fused Cutout	EA	1	7,012.13	7
9)		Electric Meter	EA	1	5,012.39	5
10)		3/4" x 10' Copper Clad Ground Rod	EA	6	504.94	3
11)	81230	30' Alum Pole, 150W LED, 2' D Conc Base	EA	19	8,977.35	171
12)	81230	60' Alum Pole, 400W LED, 3' d x 4' Base	EA	4	10,361	41
13)		3/4" x 10' Copper Clad Ground Rod	EA	23	504.94	12
14)	81230	1" PVC Conduit w/ 2-#10 & 1#10 GND	LF	3,600	20.83	75
15)	81150	Uninterruptable Power Supply	KW	3	2,101.30	6
16)	81242	UG Lines in Conduit, 4-Way 4" PVC	LF	1,200	78.39	94
17)	81242	Electric Hand Holes, 4' x 4' x 4'	EA	14	3,911.95	55
18)	93410	Excavation, Trench, 18" Wide, 3' deep	CY	200	1.89	1
19)	93410	Backfill & Compaction, Trench	CY	200	6.58	1
20)		Wire, copper stranded, 600V, 3/0 THWN-THHN	LF	11,000	1.47	16
Water, Sewer, and Gas			LS	--	--	(472)

Pine Bluff Arsenal
Arkansas

Access Control Point - Plainview 62817

		Item	U/M	Qty	Unit Cost	Cost ($000)
1)	84210	Sanitary Sewer Pipe, HDPE, 8"	LF	1,200	52.36	63
2)	84210	Sanitary Sewer Pipe, HDPE, 4"	LF	290	16.41	5
3)		Two-Way Cleanout, 4"	EA	3	1,647.01	5
4)	83210	Sanitary Sewer MH, 4'x4',8"thk	EA	2	8,491.72	17
5)	84210	Water Distribution, PVC, 8" Sch40	LF	20	234.67	5
6)	84210	Water Distribution, PVC, 6" Sch40	LF	1,420	116.66	166
7)	84210	Water Distribution Pipe, PVC, 4" Sch40	LF	160	78.67	13
8)		Water Valve, 4"	EA	2	3,213.04	6
9)		Water Valve, 6"	EA	5	7,351.15	37
10)	89240	Fire Hydrant, 4'-6' Depth	EA	1	7,706.30	8
11)		Water Meter	EA	1	2,058.76	2
12)	82410	Gas Pipeline, 2" Dia Steel Pipe, Sch40	LF	1,477	40.41	60
13)		Gas Valve, 2"	EA	3	478.48	1
14)		Gas Meter/Regulator, 2"	EA	2	2,470.50	5
15)	87110	Demo Water Pipe, 2" Dia	LF	299	2.58	1
16)	87110	Demo Water Pipe, 6" Dia	LF	1,543	29.57	46
17)	87110	Demo Sewer Pipe, 10" Dia (6-8' deep)	LF	636	29.57	19
18)	87110	Demo Sewer Pipe, 8" Dia (6-8' deep)	LF	404	29.57	12
19)		Demo Sewer Manhole (6-8' deep)	EA	3	1,118.19	3
Paving, Walks, Curbs, and Gutters			LS	--	--	(190)
1)	85220	Sidewalks, 4" Thick Cast in Place	SY	661	84.11	56
2)	93410	Raw Subgrade Compaction, by Hand	CY	110	80.03	9
3)	85110	POV Parking, Asphalt Conc Surface, 2"	SY	721	17.23	12
4)	85110	POV Parking, 6"Base Crs 1-1/2" Crsh Stone	SY	721	13.15	9
5)	93410	POV ParkingRaw Subgrade Comp, 6"	CY	120	11.12	1
6)	93310	Demo & Remove Asphalt Pvmt, 2"	SY	9,417	9.35	88
7)	93410	Base Course removal, 6"	CY	1,569	5.84	9
8)	93310	Demo & Remove Plain CONC, 4"	SY	58	19.13	1
9)	93310	Demo & Remove Plain CONC Curb/Gutter	LF	516	8.54	4
Storm Drainage			LS	--	--	(203)
1)	87110	Demo of Concrete Pipe, 24" Dia Culv	LF	53	43.27	2
2)	87110	Demo of Concrete Pipe, 36" Dia Culv	LF	61	78.67	5
3)		Selected Storm Drain Demo	CF	68	94.34	6

Pine Bluff Arsenal
Arkansas

Access Control Point - Plainview 62817

		Item	U/M	Qty	Unit Cost	Cost ($000)
4)	83210	Curb Inlet/Guttermouth 24"x10 ft	EA	8	4,117.51	33
5)	87110	Reinforced Concrete Pipe 18" Dia	LF	749	93.59	70
6)	87110	Reinforced Concrete Pipe 24" Dia	LF	316	126.16	40
7)	87110	Reinforced Concrete Pipe 36" Dia	LF	142	230.60	33
8)		Concrete Headwall, 24"	EA	1	6,658.02	7
9)		Concrete Headwall, 36"	EA	1	7,379.96	7
Site Improvements			LS	--	--	(308)
1)	87210	Chain Link Fencing, 8' high, FE6	LF	864	59.15	51
2)	87250	Chain Link DS Gate, 28'w, 8'h FE6	EA	2	3,179.65	6
3)	85110	Pavement Markings, 4" wide	LF	6,102	0.54	3
4)	93410	Backfill & Compaction, Dozer B	CY	5,562	11.12	62
5)	93410	Haul by 12 CY Truck, Excavated	CY	5,562	13.97	78
6)	87250	Demo & Remove Chain Link Fence, 8' High	LF	565	7.59	4
7)		Remove 3' high Conc Barrier	LF	142	19.06	3
8)		Demo & Rem Exist. ACP Metal Canopy, 17' H	SF	1,045	5.89	6
9)	93210	Site Clearing & Grading, Clear & Grub, Med	AC	5	10,849	54
10)		Demo Conc Tornado Shelter, in-ground	SF	64	68.62	4
11)	85110	Pavement Markings, 24" wide	SF	1,100	1.66	2
12)		Signage	EA	8	639.64	5
13)		Metal Beam Guard Fence, wood post	LF	300	97.23	29
Demolition			LS	--	--	(94)
1)		Demo Exist ACP Structures	SF	1,367	68.62	94
Information Systems			LS	--	--	(79)
Antiterrorism Measures			LS	--	--	(576)
1)		ATFP	LS	--	--	576

PREP DATE: 07 SEP 2004 ACF=0.76 UM=E
FORM/PROJECT NUMBER: 62817
PROJECT TITLE: Access Control Point - Plainview
INSTALLATION: Pine Bluff Arsenal
LOCATION: Arkansas

TAB B - PLANNING AND DESIGN DATA (ESTIMATE)

1. Status

A. Design Start Date, Estimated	NOV 2026
B. Percent Complete as of 15 SEP 2027 (Design Year)	35.00
C. Percent Complete as of 01 JAN 2028 (Budget Year)	65.00
D. Percent Complete as of 01 OCT 2028 (Program Year)	100.00
E. Concept Complete Date	JUL 2027
F. Design Complete Date	DEC 2028

G. Type of Design Contract: Design-bid-build

2. Basis

A. Standard or Definitive Design (yes/no) YES

B. Where Design was Most Recently Used:

C. Percentage of Design Utilizing Standard Design 95.00

3. Cost (Total $000)

A. Production of Plans and Specs	660
B. All Other Design Cost	220
C. Total Design Cost (C) = (A)+(B) OR (D)+(E)	880
D. Contract Architect-Engineer Design Cost, Estimated	220
E. In-House Design Cost Plus Architect Engineer Contract Supervision and Administration Cost Government Forces Design Cost, Estimated	660

4. Construction Contract Award JAN 2029

5. Construction Start Date (Planned) MAR 2029

6. Construction Completion Date MAR 2030

7. LEED Rating (at Design)

8. Design Charrette

A. Date of Design Charrette

Energy/Life Cycle Statement

An energy study and life cycle cost analysis are not applicable to this project.

PREP DATE: 07 SEP 2004 ACF=0.76 UM=E
FORM/PROJECT NUMBER: 62817
PROJECT TITLE: Access Control Point - Plainview
INSTALLATION: Pine Bluff Arsenal
LOCATION: Arkansas

TAB C - QUANTITATIVE DATA

Type of Design: This facility does not include unusual construction features that require extra design effort.

Scope: 0 SF
Size: 605 SF

Unit of Measure: SF

A. Total Requirement	8,797	
B. Existing Substandard	3,246	
C. Existing Adequate	5,551	
D. Funded, Not in Inventory		
E. Adequate Assets	5,551	
	Authorized	Funded
F. Unfunded Prior Authorization		
G. Included in FY Program		
H. Deficiency (A-E-F-G)	3,246	3,246

PREP DATE: 07 SEP 2004 ACF=0.76 UM=E
FORM/PROJECT NUMBER: 62817
PROJECT TITLE: Access Control Point - Plainview
INSTALLATION: Pine Bluff Arsenal
LOCATION: Arkansas

TAB C - GENERAL JUSTIFICATION DATA

General

The Pine Bluff Arsenal (PBA) is located 12 to 15 miles from the city of Pine Bluff, Arkansas. PBA is a "restricted access" installatioin responsible for many diverse missions, one of which is to store 12 percent of the nation's chemical stockpile. Plainview Gate Entrance serves as a major entrance for non-commercial vehicles entering Pine Bluff Arsenal with hours of opperation 24 hours per day 7 days a week. All visitors to the installation register at the security building located north of the gate. It has one inbound and outbound lane.

Traffic Analysis (Standard Text)

An Access Control Point and Traffic Study was completed by the Military Surface Deployment and Distribution Command, Transportation Engineering Agency, in August 2018. This project incorporates the findings of that study.

Analysis of Deficiencies

The current access control point is sustandard and does not comply with the requirements of Unified Facilities Criteria (UFC 4-011-02) Security Engineering: Entry Control Facilities/Access Control Points. Since there is only one inbound and one outbound lane there is a long wait for vehicles passing through the gate. Security inspections are performed on a side road on the installation side of the gate entrance. In the morning the inbound lane has double ID checkers. The wait to get onto the installation can last 15 minutes and the traffic is backed up over the bridge frequently. The vehicle search area is located on the arsenal on a side road. The gatehouse windows have no ballistic rating, but the house itself has metal plating in the walls. Lighting around the access control point consists of one wall-packs HPS light fixture mounted on the gatehouse on the inbound lane, six light fixtures mounted on the canopy (three on the inbound lane and three on the outbound lane, five-pole-mounted area light fixtures at less than 15 feet height located just inside the boundary fence at the entrance, eight pole-mounted area light fixtures at less than 15 feet height located around the perimeter of the island, and four pole mounted area lights at greater than 30 feet height located at the incoming traffic lanes.

Criteria for Proposed Construction

The proposed facility will comply with the requirements of Unified Facilities Criteria (UFC 4-011-02) Security Engineering: Entry Control Facilities/Access Control Points. An Access Control Point Study completed in Aug 2018 by the Military Surface Deployment and Distribution Command, Transportation Engineering Agency, and a follow-up ACP Conceptual Plan completed in Nov 2018 by the Omaha Center of Standardization for ACPs were used in the development of this project. The 2018 plan was updated to include current SDDC-TEA guidance and security schemes.
The Visitor Control Center (VCC) started with a Standard 3-Processor VCC to accommodate the Pass & Badge personnel, then was enlarged to accommodate an additional personnel with Traffic Management that process commercial truck traffic and perform Quality Assurance Specialist Ammunition Surveillance (QASAS) inspections of incoming and outgoing trucks carrying explosive materials. Traffic Management will be moving from Dexter Gate to Plainview when the project is complete. Dexter Gate (current commercial traffic gate) will close when the new Plainview Gate is opened.

Determination and Certification of Actual Need

An Access Control Point Site Survey, performed by the Little Rock Corps of Engineer

PREP DATE: 07 SEP 2004 ACF=0.76 UM=E
FORM/PROJECT NUMBER: 62817
PROJECT TITLE: Access Control Point - Plainview
INSTALLATION: Pine Bluff Arsenal
LOCATION: Arkansas

TAB C - GENERAL JUSTIFICATION DATA

Determination and Certification of Actual Need (CONTINUED)

District in December 2003, identifies deficiencies at each of the access control points on Pine Bluff, including the Plainview Gate Entrance. Review of the Unified Facilities Criteria (UFC 4-011-02) Security Engineering: Entry Control Facilites/Access Control Points address all of the issues that are to be addressed by the construction of the new facility and supporting infrastructure.

Installation Engineer: Stephen Redman

Phone Number: 870-540-3301

PREP DATE: 07 SEP 2004 ACF=0.76 UM=E
FORM/PROJECT NUMBER: 62817
PROJECT TITLE: Access Control Point - Plainview
INSTALLATION: Pine Bluff Arsenal
LOCATION: Arkansas

TAB C - SITE INFORMATION

Site has been approved by the following:

COL Luis Ortiz
Commander
Pine Bluff Arsenal

Site Location:
Current location of Plainview Gate

PREP DATE: 07 SEP 2004 ACF=0.76 UM=E
FORM/PROJECT NUMBER: 62817
PROJECT TITLE: Access Control Point - Plainview
INSTALLATION: Pine Bluff Arsenal
LOCATION: Arkansas

TAB C - PLANNING CHARRETTE VALIDATION

Region: HQ IMCOM

Project Sponsor: Dir of Law Enforcem & Security

Mission: HQIMCOM

Description of Location:
Hoadley Road and the location of current Plainview Gate Entrance

LEED Rating (at Planning Charrette): Not Req'd. <5000 sf

Date of Charrette: 03/11/2020

Planning Charrette Team Members:
Members listed below participated and/or provided information to the planning charrette team. All requirements for development of the project have been met, environmental documentation has been started/completed or will be completed prior to budget year, all known costs have been identified and are included in the project estimate.

Name	Title	Phone	Signed
Master Planner Lead:			
Tim Fox	Master Planner	870-540-3231	
User/Project Sponsor Rep:			
Martin Johnson	DES-LES	870-540-3499	
DPW OR Equivalent Rep:			
Stephen Redman	Director, DPW	870-540-3301	
Force Protection Officer:			
		870-540-3962	
Provost Marshal Officer:			
		870-540-3962	
Environmental Officer:			
Rodney Mays	Enviro. Officer	870-540-3919	
Info Systems Planner:			
Roy Harbison	DOIM	870-540-4064	
USACE Charrette Rep:			
Ed Murphy	DD1391 Pgm Ft Worth	817-886-1799	
USACE PM:			
Dean Halijan	USACE Little Rock	501-340-1074	
USACE CX:			
Installation PM:			
Kevin Dorman	DPW	870-540-2834	
Cost Engineer:			
Kyle McCraw	Elec Engr/Cost Engr, SWL	501-324-5030	

PREP DATE: 07 SEP 2004 ACF=0.76 UM=E
FORM/PROJECT NUMBER: 62817
PROJECT TITLE: Access Control Point - Plainview
INSTALLATION: Pine Bluff Arsenal
LOCATION: Arkansas

TAB C - PLANNING CHARRETTE VALIDATION

Name	Title	Phone	Signed
Economist:			
Region Rep:			
Command Rep:			
Roch Byrne	PBA Deputy Commander		
Fire Department:			
Alan Jarrell	Chief, DES-FES	870-540-3511	
PBA-JA:			
Dallas Heltz		870-556-0160	
Information Mgmt:			
Amanda Knight		870-540-3651	
DES:			
Shannon Stowell		870-540-4080	
DES:			
Shane A. Hubanks		870-540-3218	

Planning Charrette Discussion:

Charrette Notes for DD1391 Planning Charrette, 10-12 March 2020

Charrette was conducted at Pine Bluff Arsenal by a USACE team from Little Rock and Fort Worth Districts. The attendee sign-in sheet is included in the Attachments Tab. Charrette was started with a welcome by COL Luis Ortiz, PBA Commander, and a presentation by Deputy Commander Roch Byrne on PBA’s history and current mission. PBA employs 657 persons and produces products that are task critical in 48 OPLANS. Stephen Redman, DPW, and Tim Fox, Master Planner, then provided an overview of the ACP project.

A site visit was conducted on the afternoon of 9 March. The current gate consists of guardhouse (B24-020), one small structure (B24-011) on the outside of the incoming lane that has a small latrine, a similar structure (B24-030) on the outside of the outgoing lane (no latrine), and a concrete, semi-buried tornado shelter located next to B24-011. There is an automatic vehicle barrier(AVB) (wedge type) on each of the two traffic lanes approximately 560ft from the entry gate and approximately 336 ft from the intersection with Sibert Road.

An ACP Study was conducted by SDDC-TEA for ACPs at Pine Bluff Arsenal (PBA) and completed in Aug 2018. A follow-up conceptual plan for the Plainview Gate on Hoadley Road was completed in Nov 2018 by the ACP Center of Standardization/Protective Design Center (Omaha District). The charrette team’s goal was to start with the conceptual plan and validate PBA’s requirements. The new ACP will need to accommodate the commercial gate functions that will be moved from the Dexter Gate. The team toured the Pass & Badge office to learn their operations, and they toured the Traffic Management office at Dexter Gate (current commercial gate) to learn about their operations. New ACP will require a tornado shelter sized for staff and visitors. The Cos Conceptual Plan gets very close to a MWR Game Check Facility. Avoid or program a replacement in this project.

Current POV Process at Plainview Gate:
POVs with a valid badge approach and stop at the ID Check, then proceed on to their

PREP DATE: 07 SEP 2004 ACF=0.76 UM=E
FORM/PROJECT NUMBER: 62817
PROJECT TITLE: Access Control Point - Plainview
INSTALLATION: Pine Bluff Arsenal
LOCATION: Arkansas

TAB C - PLANNING CHARRETTE VALIDATION

Planning Charrette Discussion (CONTINUED)

destination. Vehicles selected for search, proceed through ID Check and pull over onto a paved area along the road for search. Rejected vehicles must U-turn at the gate and leave through the exit. POVs needing a pass or badge will turn left on to Dayton Rd. prior to the ID Check and go to the Pass & Badge Office in Bldg 17130 (Located north and west of the Plainview Gate). After receiving their pass/badge, POVs will proceed to the ID Check.

Pass & Badge office:
A staff of 2 processors operate the Pass & Badge office. Each has two CPUs with monitors at their workstation. A separate CPU-based badging system is located separately and shared. New employees are required to watch a safety briefing video in a separate room (10 PN) prior to receiving their badge. Space for a standard GSA security safe and personnel lockers (2 ea) are required. A duress alarm is required (Requires IDS). A visitor waiting area for 10 PN with male and female latrines is needed.

Current Commercial Vehicle Process at Dexter Gate:
Commercial trucks are required to make an appointment to schedule their arrival, or they will be turned away [exceptions are package delivery (FedEx, UPS, etc), garbage trucks, contractor dump trucks]. Commercial trucks pull into a parking area prior to the ID Check and enter the Traffic Management office to have the driver’s credentials checked/validated, receive a temporary pass/badge, and receive direction on where to drop-off or pick-up their cargo. Drivers failing the credential validation will be rejected. If the driver is carrying a firearm, those will be put into a gun safe. A Quality Assurance Specialist Ammunition Surveillance (QASAS) inspector will be called to conduct an inspection of trucks carrying ammunition in or out. Trucks failing the inspection will be rejected. An escort will be called if needed. Commercial trucks typically have two persons per vehicle, especially those carrying munitions.
Exiting trucks are required to park at a pull over area and the driver return to the Traffic Management office to turn-in their temporary pass/badge, receive their signed paperwork, and pick-up their firearm or other personal property left at entry processing. The vehicle also requires inspection and weight calculation to ensure the truck is not overweight. Traffic Management does not have a truck scale at the Dexter Gate or anywhere else on the installation that can be used. A truck scale for incoming and outgoing traffic at the new ACP is desired. Currently, staff is weighing pallets and calculating allowable load weight.
A staff of 6 occupy the office. Two require offices, and 4 require workstations. The QASAS inspector is currently not located in the Traffic Mgmt office, but would need to be co-located at the new ACP. Two small work areas are also required for the UPS and FedEx label machines. The label machines will also require connection to a commercial network. Space for a printer, file cabinets (5 ea), a visitor waiting area for 10 PN with male and female latrines, break room and a 14 PN conference room are needed. The Traffic Management office processes on average 80 less than truckloads (LTL) and 40 truckloads (TL) per week. LTLs are trucks that will be delivering only part of their cargo to PBA. TLs are trucks that will be delivering the complete load of cargo to PBA. LTLs do not require an appointment. Processing time averages 15 min/truck. Drivers that have delivered to PBA in the past, can be processed faster. Space for escort vehicles is needed at the new ACP. Staff parking will be required.

The CoS concept plan allows the existing gate to remain open during construction, however that is not a requirement per PBA leadership.

The Out-brief was held on 12 Mar. No issues with the plan presented were voiced.

Prior to the charrette, the USACE team was informed by the Center of Standardization that the safety scheme for the AVB had been changed by SDDC and may impact the concept design

PREP DATE: 07 SEP 2004 ACF=0.76 UM=E
FORM/PROJECT NUMBER: 62817
PROJECT TITLE: Access Control Point - Plainview
INSTALLATION: Pine Bluff Arsenal
LOCATION: Arkansas

TAB C - PLANNING CHARRETTE VALIDATION

Planning Charrette Discussion (CONTINUED)

from 2018. The team was unable to connect with the CoS during the charrette, but was able to conduct a teleconference with the CoS after the charrette. Brian Erickson, Omaha CoS, informed the team that new AVB safety scheme now requires a 4-5 ft wide median between the entry and exit lanes that extends 80 ft towards the entry gate. The median must include a metal beam guard fence barrier. The team also asked if modifications were allowed to the Visitor Control Center (VCC). We explained that the floor plans in the standard drawings did not accommodate PBA's requirement to combine Pass & Badge function with the commercial Traffic Management function. Mr. Erickson stated that modifications to the VCC floor plan would only require CoS approval and not a waiver to the Army Standard.

ELECTRICAL NOTES
1. Most of the projects electrical requirements are already pre-programmed into the 1391 with the exception of some site work as well as parking and roadway lighting requirements. These requirements were captured in a site plan and electrical quantities also provided.
2. There is an Installation Design Guide for Pine Bluff Arsenal which should be requested during the design charrette and utilized during the design phase.

SITE ELECTRICAL AND COMMUNICATIONS:
1. PBA manages its own utilities, however they hire contractors for installation. Not enough manning for installation during construction.
2. Demolition will be required for a single power pole in the path of the proposed roadway near the Active Vehicle Barrier (AVB).
3. Telecom are maintained by the installation. PBA is not managed by a NEC but instead is managed by a Directorate of Information Management (DOIM). DOIM has installation guidelines to be obtained during design charrette and utilized during design.
4. The new facilities shall be provided 24 strand SM fiber and 25 pair copper that shall come from building 17-120 (credit union outside gate).
5. Commercial internet is provided by AT&T.
6. There is a requirement for backup natural gas generator, ATS, and UPS systems for the ACP and its surrounding facilities. Follow COP and UFC guidelines on backup requirements.

INTERIOR ELECTRICAL, COMMUNICATIONS AND FIRE ALARM SYSTEMS:
VISITOR CONTROL CENTER:
1. Customer requested 120/208, 3 phase power to facilities.
2. Project is currently programmed for utility monitoring (EMCS) although PBA is not currently monitored utilizing a front end system.
3. Monaco D21 is the preferred fire panel transmitter. Monitored at fire station; transmitted via radio Line of Site (LOS); no obvious LOS issues
4. The current IDS requirement for the admin facility is for a duress switch only. Depending on the workstations to be put in the facility, there is a possibility for "classified" spaces and therefore a more robust IDS system as per UFC. The IDS shall be monitored by local guard shack (gatehouse); transmitted via Fiber.
ACP AND GATEHOUSE:
1. Requirement for RFID reader and 2 weight stations along roadway to the Truck ACP entrance.
2. Security cameras shall be utilized for ACP; monitored locally by Gatehouse only. CCTV racks to be located in a separate room from telecom space. DOIM shall have control over the locked telecom room, but the CCTV will be locally operated. Access to CCTV systems should not have to be coordinated with DOIM.

CIVIL NOTES:
The proposed site of the new ACP is located just south of the existing Plainview Gate and is heavily wooded. The area on the west end of the project site is paved with old

PREP DATE: 07 SEP 2004 ACF=0.76 UM=E
FORM/PROJECT NUMBER: 62817
PROJECT TITLE: Access Control Point - Plainview
INSTALLATION: Pine Bluff Arsenal
LOCATION: Arkansas

TAB C - PLANNING CHARRETTE VALIDATION

Planning Charrette Discussion (CONTINUED)

asphalt pavement. According to PBA personnel, the area was formerly used for family housing. There are no structures remaining. The southern boundary of the project site is the MWR Game Check Station (Building 24560), located approximately 400 feet south of the existing gate. If disturbed by this project, this facility will have to be replaced by this project. The project area slopes gradually to the SSW.
The approach into the existing gate, as well as the new gate, is a two-lane asphalt road with an overpass over two commercial tracks and one government owned track. Government ownership of the road starts approximately 580 feet from the west end of the overpass where E. Baldwin Road intersects E. Hoadley Road/State Highway 256. E. Hoadley Road/State Highway 256 continues west, crossing State Highway 365, and then terminating at Interstate 530 (US Highway 65).

Existing Utilities:
1) Natural Gas: Existing high pressure 8" gas is available on, and runs running parallel to, the south side of Sibert Road, and is approximately 850 feet from the existing ACP.
2) Sanitary Sewer line: There is an existing lift station (24550) just south of Building 24560 (MWR Game Check Station) that collects flow from Buildings 24560, 24770, 24761, and 24610. The lift station pumps ~175 feet to Manhole 26180, located east of B24560, and then gravity flows approximately 400 feet north in an 8” line to MH 26192 on an existing 10" Sanitary Sewer that flows east on the south side of Hoadley Road. The 10” VC line flows east from MH 26181 at the Plainview Gate, through MH 26192, approximately 637 feet to MH 26183 where it changes to an 8” VC and continues northeast crossing Hoadley and Sibert Roads. Because these pipes are well past their design life and may be deteriorating, PBA utility personnel recommend replacing the existing 10” vitrified clay pipe from MH 26181 to MH 26183, and the existing 8” line from MH 26180 to MH 26192, as part of this project. There is enough capacity to support the increased flow of 35-40 people that would account for the new VCC staff and visitors.
3) Existing Water: There is an existing 6" water line that will have to be re-routed around the new ACP to connect to the buildings to the south and the southwest. There is adequate pressure for domestic and fire protection and we can request a fire flow test to confirm.
4) Storm Drain: All current runoff is conveyed via existing ditches or overland. Based on the site visit it appears the site will have to be raised 1 to 2 feet and direct the storm drain outfall to the southwest.

Project Description:

Construct a standard design Access Control Point (ACP) and Commercial Vehicle Inspection Point. Project includes a Visitor Control Center, Gatehouse, vehicle inspection canopy, guard booths, ID check canopy, search area pedestrian shelter, roadways, parking, lighting, traffic control signals, passive and active vehicle barriers with comprehensive control systems, information systems, fire protection and alarm systems, Intrusion Detection System (IDS) installation, Cybersecurity Measures, and Energy Monitoring Control Systems (EMCS) connection. Visitor Control Center includes additional costs for antiterrorism and tornado shelter hardening requirements to protect staff and visitors. Sustainability and energy enhancement measures are included. Supporting facilities include site development, utilities and connections, site lighting, paving, parking, walks, curbs and gutters, storm drainage, information systems, landscaping and signage. Heating and air conditioning will be provided by self-contained system. Measures in accordance with the Department of Defense (DoD) Minimum Antiterrorism for Buildings standards will be provided. Comprehensive building and furnishings related interior design services are required. Access for individuals with disabilities will be provided. Since this facility type has not been constructed in several years, the OSD Unit Cost

PREP DATE: 07 SEP 2004 ACF=0.76 UM=E
FORM/PROJECT NUMBER: 62817
PROJECT TITLE: Access Control Point - Plainview
INSTALLATION: Pine Bluff Arsenal
LOCATION: Arkansas

TAB C - PLANNING CHARRETTE VALIDATION

Project Description (CONTINUED)

does not include Building Information Systems cost.

PREP DATE: 07 SEP 2004 ACF=0.76 UM=E
FORM/PROJECT NUMBER: 62817
PROJECT TITLE: Access Control Point - Plainview
INSTALLATION: Pine Bluff Arsenal
LOCATION: Arkansas

TAB D - ECONOMIC ANALYSIS

Executive Summary Report

Project Title : PN 62817 ACP (Plainview Gate) Pine Bluff Arsenal
Type of Analysis : Mission Requirement - Partial
Project Objective : To provide an Access Control Point (ACP) that will support both commercial and privately owned vehicles. Project includes a Visitor Control Center (3500 sf), Gatehouse (933 sf), inspection canopies, guard booths, ID check canopy, search area pedestrian shelter (50 sf), roadways, vehicle parking, lighting, traffic control signals, passive and active vehicle barriers.
Certification Name :
Certification Date :

Background:

The current ACP at Plainview Gate has only one entry and exit lane which results in traffic backups during peak entry times. The gate also can only accommodate cars. All trucks must enter at the Dexter gate. An ACP Study was conducted by SDDC-TEA for ACPs at Pine Bluff Arsenal (PBA) and completed in Aug 2018. A follow-up conceptual plan for the Plainview Gate on Hoadley Road was completed in Nov 2018 by the ACP Center of Standardization/Protective Design Center (Omaha District). The ACP study concluded that PBA required a single ACP with two entry lanes and facilities to accommodate both cars and trucks. This would combine both the Pass & Badge staff and the Traffic Management staff in one location for more efficient operation.

Alternatives Considered for this Analysis:

Status Quo (Current Operations) - The current facilities at the Plainview Gate do not meet current Army standards for an Access Control Point, and the guard house does not have ballistic protection. This alternative is nonviable.

Renovation - Renovating the existing Plainview Gate facilities will not increase the traffic capacity, nor accommodate commercial trucks. This alternative is nonviable.

Renovation/New Construction Mix - Renovation/New Construction Mix will not be able to bring the Plainview Gate faciliites up to Army ACP Standards. This alternative is nonviable.

New Construction - New Construction will provide a Access Control Point that meets all Army criteria, will accommodate POV and commercial truck traffic, and will provide adequate space for staff and security personnel. This is a viable alternative.

Basic Allowance for Housing (BAH) - This alternative does not apply to this project. This alternative is nonviable.

Leasing - Leasing is not an option for Access Control Points. This alternative is nonviable.

Other Facilities on Base; As Is, Renovation, or Renovation/New Construction Mix - There are no other facilities on the installation that can meet the requirements as

PREP DATE: 07 SEP 2004 ACF=0.76 UM=E
FORM/PROJECT NUMBER: 62817
PROJECT TITLE: Access Control Point - Plainview
INSTALLATION: Pine Bluff Arsenal
LOCATION: Arkansas

TAB D - ECONOMIC ANALYSIS

is or through renovation, or renovation/new construction mix. The other existing gates have at grade railroad crossings near the entry point which presents a safety issue. Plainview gate is the only gate with an overpass over the railroad. This alternative is nonviable.

Other DOD or Federal Agency Facilities - There are no other DoD or Federal Agency facilities available to meet the project requirements. This alternative is nonviable.

Contracting Services Out - The Access Control Point is not a facility that can be contracted. This alternative is nonviable.

Innovative Alternatives or Combinations of the Above Alternatives - There are not other innovative alternatives or combinations of the above alternatives that will meet the project requirements. This alternative is nonviable.

Government Owned Contractor Operated Facility (GOCO) - The Access Control Point is not a facility that can be contracted. This alternative is nonviable.

Contractor Owned Contractor Operated Facility (COCO) - The Access Control Point is not a facility that can be contracted. This alternative is nonviable.

Results and Recommendations:

New Construction is the only alternative that will meet the project requirements of an Army standard Access Control Point that will accommodate both cars and commercial trucks.

Action Officer :Edward Murphy
Phone Number :817-886-1799
Email Address :edward.a.murphy@usace.army.mil
Organization :USACE Fort Worth

PREP DATE: 07 SEP 2004 ACF=0.76 UM=E
FORM/PROJECT NUMBER: 62817
PROJECT TITLE: Access Control Point - Plainview
INSTALLATION: Pine Bluff Arsenal
LOCATION: Arkansas

TAB E - FURNISHINGS AND EQUIPMENT

Furnishings and Equipment

Item	Description	Total Cost ($000)	Proc Appr FY	Proc Appr	Est Delivery Date	Proc Status	Est Instl Cost ($000)	Instl FY	Instl Appr
1	Furnishings Footnote: Source of furniture pricing data is the Center of Standardization for this facility type	80	2029	OMA			5	2030	OMA
2	Equipment	50	2029	OPA			5	2030	OPA
3	IDS/Duress/Entry Cntl Equip	50	2029	OPA			10	2030	OPA

Information Systems Equipment

Item	Description	Total Cost ($000)	Proc Appr FY	Proc Appr	Est Delivery Date	Proc Status	Est Instl Cost ($000)	Instl FY	Instl Appr
1	Info Sys - ISC	22	2030	OPA					
2	Info Sys - PROP	161	2030	OPA					

Totals by Appropriation Type ($000)

Total OMA/OMN/3400/OM DHP:	80
Installed Equipment - Other Appropriations:	283
Total Furnishings and Equipment Amount:	363

PREP DATE: 07 SEP 2004 ACF=0.76 UM=E
FORM/PROJECT NUMBER: 62817
PROJECT TITLE: Access Control Point - Plainview
INSTALLATION: Pine Bluff Arsenal
LOCATION: Arkansas

TAB F - INFORMATION SYSTEMS COST ESTIMATE (ISCE):

PROGRAM TYPE - MCA
PRIMARY PROPONENT FUND - OPA
USACE DISTRICT - Little Rock District
Region/MACOM - AMC
CONF Primary Facility costs transferred to Tab A/DD1391 Form? - Yes

Section I - Primary Facility, Inside the 5-Foot Line - Installed Equipment (See AR 420-1, Table 4-2)

Line	Description	UM	Quantity	Adj. Unit Cost	Total Cost	F S
1	EMT 1'' W/HDW (SGL RJ45 & TV)	LF	225	4.98	1,121	C
2	EMT 1'' W/HDW (Dual Outlets)	LF	540	4.98	2,689	C
				Total	3,810	

Section II - Primary Facility, Inside the 5-Foot Line - Equipment in Place (See AR 420-1, Table 4-2)

Line	Description	UM	Quantity	Adj. Unit Cost	Total Cost	F S
1	Set, 2500 Type	EA	13	85.00	1,105	I
2	Set, Multiline	EA	1	552.94	553	I
3	Set, Weather-Proof	EA	1	1,011	1,011	I
4	FO SC Patch PNL 24 SM W/CPLRS	EA	2	509.94	1,020	C
5	MDF CONN: 100 PR W/60 FT Stub	EA	1	1,483	1,483	C
6	MDF: Standard DBL-Sided 8 VERT	EA	1	432.65	433	C
7	MDF Wire Jumper: Wrapped	EA	30	3.23	97	C
8	Outlet: SGL RJ45 W/Cable	EA	3	91.05	273	C
9	Outlet: Dual RJ45 W/Cable	EA	12	128.95	1,547	C
10	Outlet: SGL CATV, F-Type W/Cable	EA	2	86.13	172	C
11	Patch Panel, RJ45 CAT 6, 96 PORT	EA	1	645.65	646	C
12	Patch Cord RJ45 CAT6, 7 FT	EA	25	6.36	159	C
13	EQUIP Rack&HWD	EA	2	462.62	925	C
14	FO-SM DUPL Cord: SC, 5 FT	EA	24	174.18	4,180	C
15	Protected Terminal: 25 PR	EA	1	611.19	611	C
16	SWT-S: 24 User (NIPR)	EA	1	15,548	15,548	I
				Total	29,763	

Section III - Supporting Facilities, Outside the 5-Foot Line - Installed Equipment (See AR 420-1, Table 4-2)

Line	Description	UM	Quantity	Adj. Unit Cost	Total Cost	F S
1	Maintenance Hole Precast	EA	2	7,285	14,571	C

PREP DATE: 07 SEP 2004 ACF=0.76 UM=E
FORM/PROJECT NUMBER: 62817
PROJECT TITLE: Access Control Point - Plainview
INSTALLATION: Pine Bluff Arsenal
LOCATION: Arkansas

TAB F - INFORMATION SYSTEMS COST ESTIMATE (ISCE):

Section III - Supporting Facilities, Outside the 5-Foot Line - Installed Equipment (See AR 420-1, Table 4-2)

Line	Description	UM	Quantity	Adj. Unit Cost	Total Cost	F S
2	UG Duct: 2-Way	LF	1,968	5.59	11,001	C
3	UG Duct: 2-WAY CONC-ENC	LF	360	10.81	3,892	C
4	Innerduct 4-1''	LF	2,400	4.20	10,080	C
5	GIP 4'' 2-Way Boring/Pushing	LF	60	60.81	3,649	C
6	Trench: Backhoe 24''X 36''	LF	2,208	7.42	16,383	C
7	Trench: Handdig 24''X 36''	LF	120	20.79	2,495	C
8	Cut & Resurface Asphalt 4''	SF	225	8.07	1,816	C
9	Cut & Resurface Concrete 4''	SF	113	9.89	1,118	C
10	CONC Core Drill 4'' Diameter	EA	4	148.38	594	C
				Total	65,599	

Section IV - Supporting Facilities, Outside the 5-Foot Line - Equipment in Place (See AR 420-1, Table 4-2)

Line	Description	UM	Quantity	Adj. Unit Cost	Total Cost	F S
1	Card: Voice, 1 Port	EA	15	232.25	3,484	I
2	UG: 25 PR, 24 AWG (B1)	LF	1,400	1.26	1,764	C
3	UNDGRD: 25 PR, 24 AWG (OSP)	LF	1,000	1.26	1,260	C
4	FO Cable DC DIELEC SM 24 Strand (OSP)	LF	2,400	4.16	9,984	C
				Total	16,492	

Section V - Mission Unique Equipment

Line	Description	UM	Quantity	Adj. Unit Cost	Total Cost	F S
1	CCTV Cameras	EA	20	6,425	128,506	P
2	CCTV Monitors	EA	15	1,285	19,276	P
3	CCTV NVR	EA	1	12,851	12,851	P
				Total	160,633	

Information Systems Cost Summary:

PREP DATE: 07 SEP 2004 ACF=0.76 UM=E
FORM/PROJECT NUMBER: 62817
PROJECT TITLE: Access Control Point - Plainview
INSTALLATION: Pine Bluff Arsenal
LOCATION: Arkansas

TAB F - INFORMATION SYSTEMS COST ESTIMATE (ISCE):

	CONF	ISC	PROP	Total
Primary Facility	15,356	18,217	0	33,573
Supporting Facility	78,607	3,484	0	82,091
Mission Unique Equipment	0	0	160,633	160,633
Total	93,963	21,701	160,633	276,297

Cost Model Project Information:

Square Footage

Project Fiscal Year: 2029 **Estimate Name:** 62817

Square Footage	Building Name	Visitor Control	(B1)				
	Admin	Intermediate	Barracks	Warehouse / Storage	Clinic / Medical	Classroom	Others	Total
(SF/Outlet)	(80 SF)	(200 SF)	(150 SF)	(5000 SF)	(80 SF)	(80 SF)	(500 SF)	
Basement	0	0	0	0	0	0	0	0
1st Floor	960	0	0	0	0	0	0	960
2nd Floor	0	0	0	0	0	0	0	0
3rd Floor	0	0	0	0	0	0	0	0
4th Floor	0	0	0	0	0	0	0	0
5th Floor	0	0	0	0	0	0	0	0
6th Floor	0	0	0	0	0	0	0	0
7th Floor	0	0	0	0	0	0	0	0
8th Floor	0	0	0	0	0	0	0	0
9th Floor	0	0	0	0	0	0	0	0
10th Floor	0	0	0	0	0	0	0	0
Total	960	0	0	0	0	0	0	960
Outlet Type	Dual	Dual	Dual	Dual	Medical	Dual	Dual	
# Outlets	12	0	0	0	0	0	0	

Initial New Services Required

Project Fiscal Year: 2029 **Estimate Name:** 62817

New Services	Building Name	Visitor Control (B1)
	New	**Notes**
Single Line Phones (Analog/Digital)	10	One per user.
Multi-line Phones (Analog/Digital)	1	One per secretary (not to exceed 10% of population).
Single Line Phones (VoIP)	0	One per user if VoIP is enabled.
Multi-line Phones (VoIP)	0	One per secretary (not to exceed 10% of population) if VoIP is enabled.
Softphones	0	One per user. No other phone or headset is to be provided.
Headsets	0	One per user. No other phone or headset is to be provided.
Wall Phone Outlet w/ Telephone Set	3	One per equipment room; plus safety and convenience locations.
Wall Phone Outlet w/ Telephone Set (VoIP)	0	One per user if VoIP is enabled.
Weatherproof Phones	1	One per building (exterior unattended door).
Explosive Environment Phones	0	HAZMAT facilities: i.e., paint/battery/chemical/etc.
LAN Ports	10	One per authorized NIPRNET user.
Fiber Optic Outlets (2 RJ-45 w/Dual SC)	0	As required; replaces non-fiber outlets (special needs only).
SIPRNET	0	One per authorized SIPRNET user.
TV Outlets - All Services	2	1.5 per barracks bed area (Round up to next whole number).

Mission Unique Services	Building Name	Visitor Control (B1)
Team/Huddle Room (6 Person):	0	Stand alone with no control room connectivity
Small Conference Room (12 Person):	0	Stand alone with no control room connectivity
Small Conference Room Enhanced (12 Person):	0	With control room connectivity
Medium Conference Room (24 Person):	0	Stand alone with no control room connectivity
Medium Conference Room Enhanced (24 Person):	0	With control room connectivity
Large Conference Room (35 Person):	0	Stand alone with no control room connectivity
Large Conference Room Enhanced (35 Person):	0	With control room connectivity
Classroom (20 Person):	0	Stand alone with no control room connectivity
Classroom Enhanced (20 Person):	0	With control room connectivity
Training Room (18 Person):	0	Stand alone with no control room connectivity
Training Room Enhanced (18 Person):	0	With control room connectivity
Executive Conference Room (35 Person):	0	Stand alone with no control room connectivity
Executive Conference Room Enhanced (35 Person):	0	With control room connectivity
Command Briefing Room (Secret with VTC 150 person):	0	Stand alone with no control room connectivity
Command Briefing Room Enhanced (150 Person):	0	With control room connectivity
Audio Visual Control Room (1for TS/SCI and 1 for all other classifications):	0	

Cable, Switching and Building Requirements

Project Fiscal Year: 2029 **Estimate Name:** 62817

Cable, Switching, and Building	**Building Name**	**Visitor Control (B1)**
Item	**Value**	**Notes**
Initial # of Building Occupants	10	
Number of Ducts into Building	Maximum Occupant Capacity - 1 to 99	
Type of Building	Administrative / Office	Default Choice. Use with all Administrative facilities.
Building Entry Duct / System Length Underground (Distance in Linear Feet)	1400	Generates duct system from the new building to a local IT access point. Generates maintenance hole(s) for projects containing multiple buildings.

Outside Cable Plant

Project Fiscal Year: 2029 **Estimate Name:** 62817

Telephone Switching Requirements:

Existing **DCO**

Outside Cable Plant	Complex Serving DCO/RSU			
	Existing/Available	**Proposed**	**Total**	**Notes**
Aerial (Figure 8)	0	0	0	Rarely used; self-supporting - cable and messenger in one.
Buried (Trenched)	0	0	0	Rarely used; back-hoe and hand-dig trenching used.
Underground	0	1,000	1,000	I3A Standard Outside Plant Construction; maintenance hole and duct system.
Total	0	1,000	1,000	Should account for total OSP requirement.

* Distance in Linear Feet

PREP DATE: 07 SEP 2004 ACF=0.76 UM=E
FORM/PROJECT NUMBER: 62817
PROJECT TITLE: Access Control Point - Plainview
INSTALLATION: Pine Bluff Arsenal
LOCATION: Arkansas

TAB G - ANTITERRORISM PROTECTION

Parameters for Minimum AT Standards for Buildings

Building Type	Building Category	Controlled Perimeter	Building Three Stories or More
Visitor Control Center	Inhabited	No	No
Gatehouse, Guard Booths and Overwatch	Uninhabited	No	No

Antiterrorism Protection Measures

This project has been coordinated with the installation's antiterrorism plans. Risk and threat analyses have been performed in accordance with DA PAM 190-51 and Unified Facilities Criteria (UFC) 4-020-01, respectively. Protective measures required by regulation and additional protective measures, above the minimum required by UFC 4-010-01 "Department of Defense Minimum Antiterrorism Standards for Buildings," are needed to mitigate the threat. These requirements are included in the description of construction and cost estimate.

Risk Analysis = YES Dated 29 APR 2020
Threat Analysis = YES Dated 29 APR 2020

Summary of Risk and Threat Analyses and Description of any Protective Measures that are Required

Visitor Control Center (VCC):
- No additional antiterrorism requirements. Minimum standards addressed in UFC are adequate for the VCC.

Gatehouse, Guard Booths and Overwatch:
- Windows: Ballistic resistant protection Underwriters Laboratories (UL) 752 Level 8 for all glass. Provide translucent or figured glazing to limit viewing into the facility to the extent possible without restricting views out of the facility during day and night operations.
-Doors: Stock hollow steel doors, or steel clad with steel frames.
-Walls: Ballistic resistant protection UL 752 Level 5 Concrete Masonry (Fully Grouted)
- Other Equipment: Install the heating, ventilating, and air conditioning (HVAC) equipment out of the line of sight behind the ACP or provide ballistic protection.
- Provide passive vehicle barriers (Concrete Bull nose wall with impact attenuator) at each traffic island to protect personnel from potential injury caused by a vehicle leaving the roadway or lane and to provide personnel with cover in the event of an attack.
- Gate enabling the ACP to be closed at the installation perimeter when not in use. The gate must maintain an equivalent level of security as the adjacent fence/barriers. Must have signage and retroreflectivity.
- Each inbound lane of traffic must be equipped with cameras capable of reading license plates and viewing drivers in the identification check areas and inspection areas.
- Must be equipped with DVR capability for 24 hour/7 days a week operation.
- Line-of-sight of security personnel through the ACP must not be impeded, therefore, line-of-sight considerations must be included in the landscape design. This includes consideration of overwatch positions, which require an adequate and acceptable line-of-sight.

PREP DATE: 07 SEP 2004 ACF=0.76 UM=E
FORM/PROJECT NUMBER: 62817
PROJECT TITLE: Access Control Point - Plainview
INSTALLATION: Pine Bluff Arsenal
LOCATION: Arkansas

TAB G - ANTITERRORISM PROTECTION

Required Signatures:

Provost Marshal

/S/ Ronald D. R. Nance

Dir, Law Enforcement & Sec
23 SEP 2004

Director of Public Works

Stephen Redman
DAC
Director of Public Works

Force Protection Officer

/S/ Timothy Vickers

Lead Security Specialist
23 SEP 2004

PREP DATE: 07 SEP 2004 ACF=0.76 UM=E
FORM/PROJECT NUMBER: 62817
PROJECT TITLE: Access Control Point - Plainview
INSTALLATION: Pine Bluff Arsenal
LOCATION: Arkansas

TAB H - DISPOSAL/DEMOLITION SUPPORT DATA

Disposal/Demolition Facility List

	SUID	Installation	Fac No	Catcode	TC	Total Quantity	UM	In The FP?	Disposal FY
1	6798	Pine Bluff Arsenal	24-010	14113	S	168	SF	Y	2029
2	6798	Pine Bluff Arsenal	24-020	14113	S	162	SF	Y	2029
3	6798	Pine Bluff Arsenal	24-030	14113	S	162	SF	Y	2029
4	6798	Pine Bluff Arsenal	24-040	14113	S	81	SF	Y	2029
5	6798	Pine Bluff Arsenal	24-021	14113	S	794	SF	Y	2029

Total Number of Buildings for Disposal/Demo (funded by this project) = 5

Total Area of Buildings for Disposal/Demo (funded by this project) = 1,367 SF

Disposal/Demolition Data

The existing ACP structures will be demolished as part of this MCA project. The new ACP will be larger than the current configuration due to current requirements and the addition of a VCC with Pass & Badge and Traffic Management staff at the ACP.

PREP DATE: 07 SEP 2004 ACF=0.76 UM=E
FORM/PROJECT NUMBER: 62817
PROJECT TITLE: Access Control Point - Plainview
INSTALLATION: Pine Bluff Arsenal
LOCATION: Arkansas

TAB I - REAL PROPERTY MAINTENANCE ACTIVITY AND ENVIRONMENTAL COMPLIANCE

RPMA Discussion

The existing Plainview Gate Entrance complex of buildings 24-010, 24-020, and 24-030 will be demolished as part of this project. The new ACP is slightly larger, 605 sf vs. 492 sf, for the three existing structures or an increase of 113 sf.

PREP DATE: 07 SEP 2004 ACF=0.76 UM=E
FORM/PROJECT NUMBER: 62817
PROJECT TITLE: Access Control Point - Plainview
INSTALLATION: Pine Bluff Arsenal
LOCATION: Arkansas

TAB J - ENVIRONMENTAL ANALYSIS

Environmental Documentation

Based on information provided in the Planning Charrette Validation (Tab C), the environmental concerns cross several media including air and water. With demolition of the existing access control facility, all asbestos related materials will need to be addressed in accordance with the Arkansas Energy & Environment, Division of Environmental Quality Regulation No. 21. The project proposes to add a new emergency generator, which requires PBA's Title V Air Permit to be modified. Any demolition and construction activities associate with the project will need to adhere to state-issued NPDES construction permits and associated Stormwater Pollution Prevention Plans (SWPPPs). Erosion controls should be implemented in accordance with the SWPPP and best management practices (BMPs). If any Water of the State is crossed or disturbed a Short Term Activity Authorization will be needed from the Department of the Environment. Additionally, if any wetlands are identified in the footprint of the project the USCOE 404 Permit will be needed. There are no Threatened and Endangered species present on the Pine Bluff Arsenal property. No known land use restrictions affect the area of the proposed project. No known soil or groundwater contamination exists in the area of the proposed project.

PBA's Risk Management and Regulatory Affairs (RMRA) Environmental Compliance Division is available to assist the Corps of Engineers with navigating the environmental regulations surrounding this project.

Summary of Environmental Consequences

This project will not affect the environment significantly. A Draft Environmental Assessment (EA) for Implementation of Master Planning Action at the Mission District is currently being prepared for PBA. The draft EA finds that issuance of a Finding of No Significant Impact (FONSI) is appropriate. PBA's Environmental Compliance Division agrees with the EA, and considers the proposed EA as sufficient supporting documentation that this project will not affect the environment significantly.

Environmental Standard Text

The Record of Environmental Consideration (REC) is included. It has been determined that the action qualifies for categorical exclusion, No Extraod Circumsta 32 CFR part 651.

Environmental Officer

/S/ Doug McKim

Chief of Environmental Complia
29 Apr 2019

PREP DATE: 07 SEP 2004 ACF=0.76 UM=E
FORM/PROJECT NUMBER: 62817
PROJECT TITLE: Access Control Point - Plainview
INSTALLATION: Pine Bluff Arsenal
LOCATION: Arkansas

TAB J - ENVIRONMENTAL ANALYSIS

Director of Public Works

Stephen Redman
DAC
Director of Public Works

PREP DATE: 07 SEP 2004 ACF=0.76 UM=E
FORM/PROJECT NUMBER: 62817
PROJECT TITLE: Access Control Point - Plainview
INSTALLATION: Pine Bluff Arsenal
LOCATION: Arkansas

TAB J - NEPA DOCUMENTATION STATUS

NEPA Document Type:

Performed by:

Cost to Prepare Documentation ($000):

NEPA Timelines:

Scheduled NEPA Start Date:
Scheduled NEPA Completion Date:

Actual NEPA Start Date:
Actual NEPA Completion Date:

The Following Items Pertain to this Project:

	Scheduled		Actual	
	Start	Complete	Start	Complete
NHPA Section 106 Consultation	N/A	N/A		
NHPA Agreement Document	N/A	N/A		
ESA Section 7 Consultation	N/A	N/A		
Wetlands Permitting	N/A	N/A		
UXO	N/A	N/A		

Earliest Contract Award Date:

Various Dates last modified on: 12 Aug 2020

Point of Contact

Name:
Title:
Phone Number:

Remarks/Explanation

PREP DATE: 07 SEP 2004 ACF=0.76 UM=E
FORM/PROJECT NUMBER: 62817
PROJECT TITLE: Access Control Point - Plainview
INSTALLATION: Pine Bluff Arsenal
LOCATION: Arkansas

TAB J - PROTECTION OF HISTORIC PROPERTIES

Historic and Archeological Sites (Standard Text)

Review procedures have been implemented for this project in accordance with 36 CFR 800. The review has established that there will be no effect.

Detailed Statement of Review Findings

These are past review findings: a. There are no Category I, II, or III historic properties on the Arsenal. (1) One old cemetary is known to exist on the Arsenal. It contains five to six graves. The gravestones indicate that this cemetry dates from around 1900. It is cared for according to Army regulations. (2) There are six early home sites found on the Arsenal; however, on five of these sites only foundations remain. Dr. Scale's farmhouse is still in existence. The exact age of the structure is not known. (3) Approximately 22 farm/homestead sites are located at various undisturbed parts of the Arsenal. (4) In some areas, the mounds are clumped together as a town site. Stone artifacts denote possible occupancy as early as 3000 B.C. to as late as 500 to 1000 A.D. All are of the preceramic era. b. The proposed work will be accomplished in an area which will have no ill effect on historical or archeological sites on the Arsenal. (1) No damage to historical or archeological artifacts is expected to result from this project. (2) There have been four studies which included portions of the Arsenal acreage, including the area now within the National Center for Toxicological Research (NCTR). (a) Burney McClurken (1967) reported no sites, but indicated the land surfaces at the west of the bluff overlooking the Arsenal (east boundary) has portential for archaeological sites. (b) Hearfield, Price and Green (1990/81) reported no sites within two Arsenal sites covering about 225 acres; sites of opertional Hazardous Landfill (FY83 MCA PN 66) and completed mounds were identified as geological. No archaeological sites were noted. (c) Corps of Engineers, Tulsa District (1983)report no sites within one Arsenal site covering about 27 acres; site of former BZ Agent/Munititions Disposal Facility (FY84 MCA PN 70) (d) Corps of Engineers, Little Rock District (Dunn 1988) archaeological reconnaisance reported no sites within a ten acre outgrant (for a transmitting tower) to the Arkansas State Police. (3) Should any cultural materials appear during construction, further impact will be avoided pending consultation with the Arkansas state Historic Preservation Officer. The proposed action will take place entirely within the bound of the installation and will not affect any offpost historic/archaeological site.

SHPO Statement of Concurrence

A programmatic agreement was signed between the Department of Defense and the National Council of SHPO's in 1986 concerning World War II temporary structures. This project is in full compliance with the National Historic Preservation Act. ///signed/// Libby Madar, Real Property Officer, Pine Bluff Arsenal Directorate of Public Works, Engineering Plans and Service Div.

SHPO Statement of Non-Concurrence

Request to ACHP

Memorandum of Agreement

PREP DATE: 07 SEP 2004 ACF=0.76 UM=E
FORM/PROJECT NUMBER: 62817
PROJECT TITLE: Access Control Point - Plainview
INSTALLATION: Pine Bluff Arsenal
LOCATION: Arkansas

TAB J - PROTECTION OF HISTORIC PROPERTIES

PREP DATE: 07 SEP 2004 ACF=0.76 UM=E
FORM/PROJECT NUMBER: 62817
PROJECT TITLE: Access Control Point - Plainview
INSTALLATION: Pine Bluff Arsenal
LOCATION: Arkansas

TAB J - EVALUATION OF FLOOD HAZARDS AND ENCROACHMENT ON WETLANDS

Evaluation of Flood Hazards and Encroachment

Evaluation of Flood Hazards (Standard Text)

This project is not sited in a floodplain or wetlands.

PREP DATE: 07 SEP 2004 ACF=0.76 UM=E
FORM/PROJECT NUMBER: 62817
PROJECT TITLE: Access Control Point - Plainview
INSTALLATION: Pine Bluff Arsenal
LOCATION: Arkansas

TAB J - ACCESSIBILITY STANDARDS

Accessibility Standards

This project will be designed for accessibility and usability by individuals with disabilities. The estimated count of civilian employees and civilian users is 11.

Hazards to Individuals with Disabilities

Accessibility Standards (Standard Text)

PREP DATE: 07 SEP 2004 ACF=0.76 UM=E
FORM/PROJECT NUMBER: 62817
PROJECT TITLE: Access Control Point - Plainview
INSTALLATION: Pine Bluff Arsenal
LOCATION: Arkansas

TAB J - ENERGY AND UTILITY REQUIREMENTS

Summary of Energy Requirements

Summary of Utility Support

The electric service for the facility consists of 350 FT of primary 15KV underground line to a new 300 kVA transformer. Secondary service is 208Y/120 V 3-phase underground line. Fire protection water line will be " approximately 250 LF and potable water line is 1" approximately 370 LF.

User Discretionary Block

PREP DATE: 07 SEP 2004 ACF=0.76 UM=E
FORM/PROJECT NUMBER: 62817
PROJECT TITLE: Access Control Point - Plainview
INSTALLATION: Pine Bluff Arsenal
LOCATION: Arkansas

TAB J - STORM DRAINAGE/LOW IMPACT DEVELOPMENT

Description of Planned LID BMPs:

Planned LID BMPs include bioretention and swales.

APPENDIX N
LIFE CYCLE COST ANALYSIS (LCCA)

Energy and Life-Cycle Cost Analysis Report

Pine Bluff Arsenal – Access Control Point Visitor Control Center (VCC)

U.S. Army Corps of Engineers – Little Rock District

White Hall, Arkansas
September 6, 2024

Contents

Disclaimer iii

1 Executive Summary 1
1.1 HVAC System Comparison and Analysis 1

2 References 1

3 Analysis Methodology 2
3.1 Energy Modeling 2
3.2 Life Cycle Cost Analysis 2

4 HVAC System Comparison and Analysis 3
4.1 Selected Alternatives 3
4.2 Energy Modeling Results 4
4.3 Life Cycle Cost Analysis Results 7
4.4 Results Discussion 8

Tables

Table 1. Annual Site Energy Consumption Breakdown 5
Table 2. Annual Site Energy Costs Breakdown 5
Table 3. Comparative Present Value Costs Alternatives 7
Table 4. Performance Rating 8

Figures

Figure 1. Annual Energy Cost Summary 4
Figure 2. Annual Site Energy Consumption Breakdown 6
Figure 3. Life Cycle Cost Summary 7

Appendices

Appendix A HVAC Comparison Inputs and Assumptions
Appendix B HVAC Comparison Energy Model Results
Appendix C Life Cycle Cost Analysis

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Disclaimer

The information presented in this report and any attached appendices and documents is for the purpose of guidance and assistance in design only and does not represent the actual energy use of the building or its individual systems. There are a number of factors that may cause the actual energy use of the building to diverge from the projected energy use of the model, including without limitation differences in building construction relative to the building modeled; differences in actual weather conditions relative to the weather modeled; variations in schedules for equipment, systems, and occupancy; inconsistencies in the application of controls and operations strategies compared to those used in the model; the level of direct loads; and changes in connected loads and electricity and gas rates. HDR has exercised all reasonable efforts, consistent with the degree of skill and care normally exercised by similarly situated members of the profession performing similar services at the same time and in the same locale as the Project, to confirm the accuracy of the energy model inputs, including verifying that actual details correspond to the building as it is currently designed. This document may contain information regarding third-party products and equipment, the inclusion of such information is not an endorsement by HDR.

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1 Executive Summary

This report presents the results of energy and life-cycle cost analysis of a new Visitor Control Center for the Pine Bluff Arsenal in White Hall, AR. The proposed building has a total conditioned area of approximately 5,000 sq. ft. and consists of a lobby, offices, breakroom, conference room, storage/file rooms, mechanical room, and comm room.

In accordance with federal sustainability requirements, analyses were performed to evaluate and determine the appropriate design strategy with respect to building HVAC system.

1.1 HVAC System Comparison and Analysis

Three HVAC system alternatives were compared:

- HVAC Alternative #1 – Heat Pumps with DOAS
- HVAC Alternative #2 – VRF System with DOAS
- HVAC Alternative #3 – DX VAV AHU with Electric Reheat Terminal Units
- HVAC Alternative #4 – ASHRAE Baseline System 4: Packaged Heat Pump RTU

A building-level life-cycle cost analysis (LCCA) was performed to evaluate the proposed system alternatives. The analysis was calculated using a 40-year building life and equipment lives. Individual component life expectancies are reflected by the inclusion of appropriate replacement and salvage values.

Results of the HVAC system comparison LCCA indicate that the DX VAV AHU system option is the most overall life-cycle cost effective and life-cycle energy cost effective out of all alternatives analyzed. Further details and results of the analysis can be found in subsequent sections of this report, and its appendices.

2 References

References listed below informed the creation and execution of the analysis presented in this report:

- Unified Facilities Criteria 1-200-02 (with Change 2, 01 Dec 2020), High Performance and Sustainable Building Requirements
- Memorandum, Army Sustainable Design and Development Policy (17 Jan 2017)
- Code of Federal Regulations, Title 10 Part 436 Subpart A, Federal Life Cycle Cost Methodology and Procedures
- ASHRAE Standard 90.1-2019, Energy Standard for Buildings Except Low-Rise Residential Buildings
- NIST Handbook 135, Life-Cycle Costing Manual for the Federal Energy Management Program

3 Analysis Methodology

3.1 Energy Modeling

The energy analysis of this project to compare HVAC systems was performed using accepted, standard engineering calculation procedures and the computer program Trane Trace 700. Trace is a program designed to determine the energy consumption behavior of proposed and existing buildings utilizing an hour-by-hour (8,760) simulation procedure for an entire year.

Although every attempt has been made to model the actual building conditions that will exist when construction is complete and while Trace is generally accepted as an industry standard in energy simulation, the predicted energy consumption should not be interpreted as an absolute prediction of the actual usage. Actual conditions may differ from the original assumptions due to unpredictable variables such as changes in occupancy schedules, equipment selection and installation, building construction and operation, and weather variations from a typical year.

A computer model was developed from new design documents and future concept plans to define the energy performance. This model is referred to as the "proposed case” or “as designed” model. This proposed case (Alternative 4) model was modified to become the baseline case according to ASHRAE Standard 90.1-2019, Appendix G “Performance Rating Method”. Alternatives 1, 2, and 3 were modeled based on the proposed case, with identical construction, lighting, and room assignments, but with different HVAC systems as described in this document. These four models were then compared against each other to obtain the energy and energy cost savings of each.

3.2 Life-Cycle Cost Analysis

Life-cycle cost analysis were performed per the requirements of UFC 1-200-02 using Building Life Cycle Cost (BLCC) software version 5.3. BLCC was developed by NIST to provide computational support for the analysis of capital investments in buildings.

Whole building and individual component LCCAs were performed using a 40-year study period and include the costs associated with salvage and replacement of equipment and related components.

Energy price escalation rates and discount rates are established by the DOE. Following FEMP conventions for calculation life-cycle costs in constant-dollar terms, real energy price escalation rates must be considered when computing future energy costs. These escalation rates are built into BLCC and are utilized for this analysis. A real discount rate of 3.0% was utilized.

Initial costs were developed primarily using component pricing from the 2024 Release of RS Means. Some costs were developed with input from supplier representatives and/or were determined by past project experience. Service life expectancy is per ASHRAE equipment life expectancy. Maintenance costs and residual/salvage values were estimated based on engineering judgement, past project experience, and equipment initial costs.

Utility rates for White Hall, AR were based on the energy companies and are stated further down in this report.

Refer to the Appendix to this report for all analysis inputs and outputs.

4 HVAC System Comparison and Analysis

4.1 Selected Alternatives

HVAC System alternatives picked for consideration for this project were determined based on HDR's opinion of feasible systems.

The alternatives consist of:

- HVAC Alternative #1 (Heat Pumps) – Individual DX heat pumps provide cooling and heating for individual fan coil units and ceiling cassettes. Ventilation provided by dedicated outside air handling unit with DX coil and fix plate sensible and latent energy recovery.
- HVAC Alternative #2 (VRF) – Variable refrigerant flow system provides cooling and heating for individual fan coil units and ceiling cassettes. Ventilation provided by dedicated outside air handling unit with DX coil and fix plate sensible and latent energy recovery.
- HVAC Alternative #3 (DX VAV/AHU) – Variable air volume air handling unit with single duct terminal units. Cooling provided by DX coils and heating provided by electric resistance reheat coils. Ventilation air induced by air handling unit.
- HVAC Alternative #4 (ASHRAE Baseline System 4) – Packaged Heat Pump Rooftop Units. Cooling provided by DX constant volume RTUs. Heating provided by natural gas heaters. Ventilation air induced by rooftop unit.

The energy model utilized the following interior space temperatures and corresponding relative humidity:

- Lobby, Office, Restrooms, Conference, Breakroom: 68 to 74°F and maximum of 50% RH
- Comm Room: 65 to 78°F and maximum of 50% RH
- Electrical, Mechanical Rooms: 40 to 80°F

Energy model utilized 94.9°F dry bulb (DB)/77.3°F wet bulb (WB) for worse case summer ambient conditions and 25.2°F DB for worse case winter ambient conditions.

The energy model assumed the building is occupied from 0700 to 1800 Monday through Friday.

Based on data provided by the government an electrical rate of $0.09/kWh was used in the LCCA. Water and Gas rates are not included since none of the alternative systems utilize these utilities.

4.2 Energy Modeling Results

The VAV AHU option (Alternative 3) shows the lowest energy usage but is marginally lower than the VRF option (Alternative 2). All three options (Alternatives 1, 2, & 3) have a lower annual energy usage and cost than the Baseline (Alternative 4). Though the improvement of the heat pump (Alternative 1) is slightly better than the baseline system.

Figure 1. Annual Energy Cost Summary

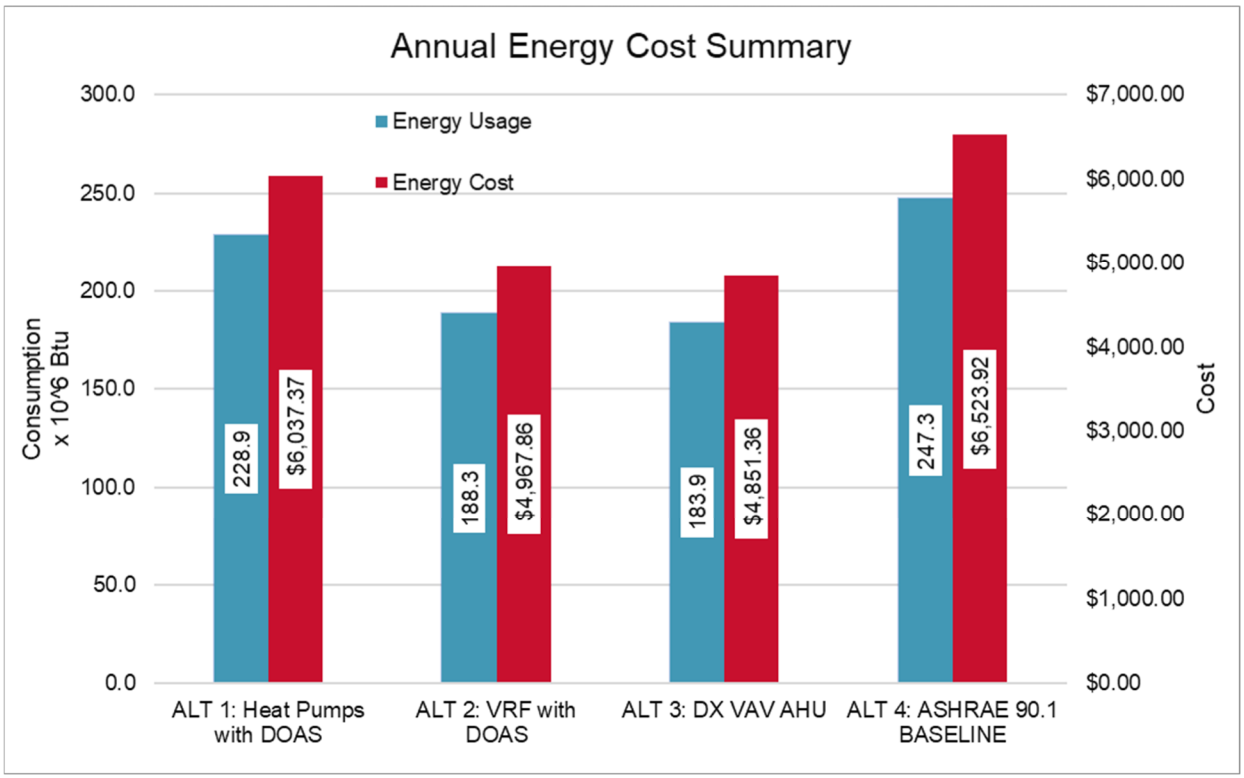


Table 1. Annual Site Energy Consumption Breakdown

Energy Use	Annual System Energy Consumption			
	ALT 1: Heat Pumps with DOAS	ALT 2: VRF with DOAS	ALT 3: DX VAV AHU	ALT 4: ASHRAE 90.1 BASELINE
Electricity, kWh	67,082	55,199	53,904	72,488
Natural Gas, MMBtu	0.0	0.0	0.0	0.0
Total System Energy, MMBtu	228.9	188.3	183.9	247.3
Receptacle Load, MMBtu	69.6	69.6	69.6	69.6
Total Less Receptacle Load, MMBtu	159.3	118.7	114.3	177.7
Total Energy Savings*, MMBTU	18.4	59.0	63.4	0.0
Total Energy Savings* (%)	**10.4%**	**33.2%**	**35.7%**	**0.0%**
Lowest Energy Lifecycle Usage			**X**	

Table 1 - Annual site energy consumption breakdown

*Total savings compared to Baseline

Table 2. Annual Site Energy Costs Breakdown

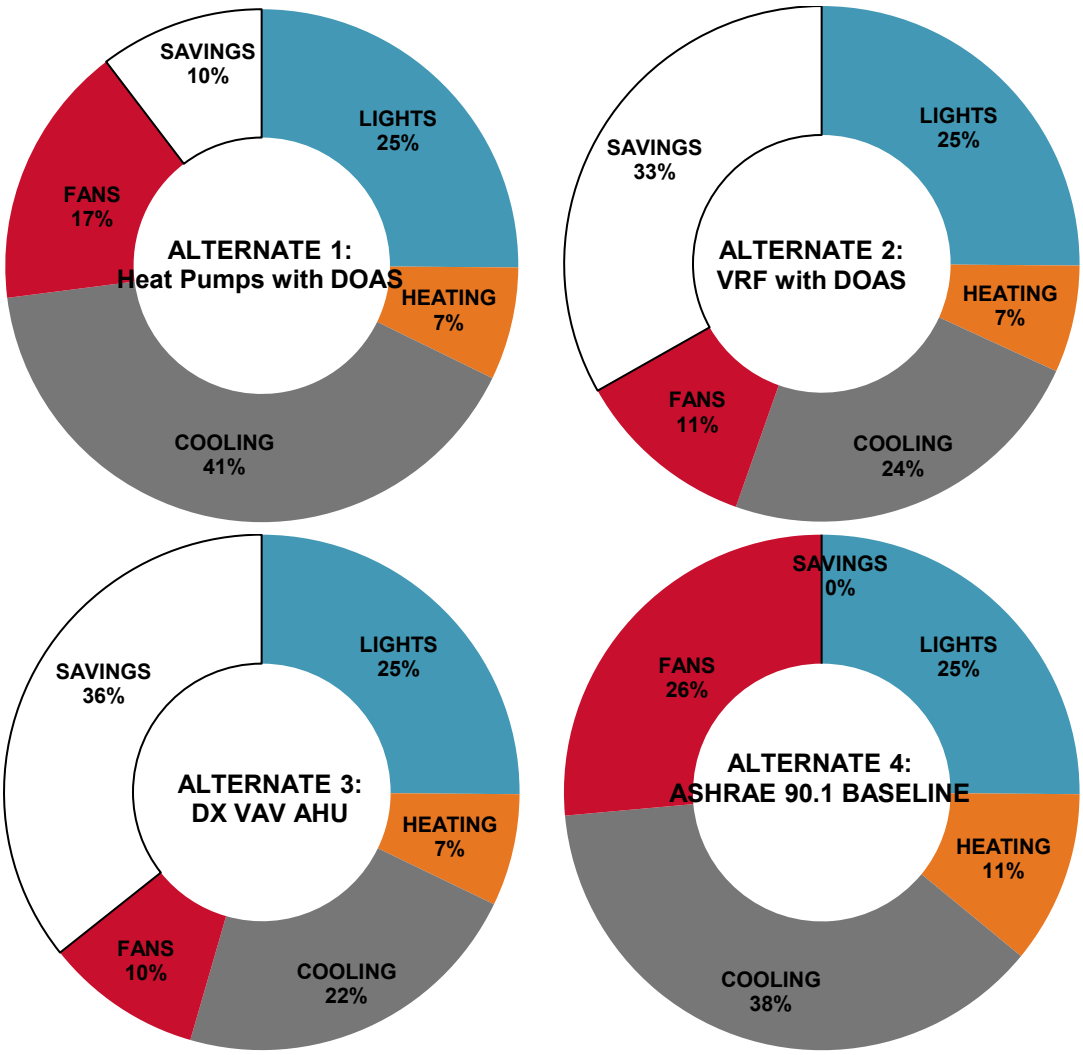
Energy Cost	Annual Energy Cost			
	ALT 1: Heat Pumps with DOAS	ALT 2: VRF with DOAS	ALT 3: DX VAV AHU	ALT 4: ASHRAE 90.1 BASELINE
Electricity, $	$6,037	$4,968	$4,851	$6,524
Natural Gas, $	$0	$0	$0	$0
Total Energy Cost, $	$6,037	$4,968	$4,851	$6,524
Total Energy Cost Savings, $	**$487**	**$1,556**	**$1,673**	**$0**
Lowest Energy Lifecycle Cost			**X**	

Table 2 - Annual site energy costs breakdown

*Total savings compared to Baseline

All three alternatives show savings over the baseline primarily due to the increased fan energy demand, at 26%, required by the larger constant volume fans of the roof top units. The VRF option (Alternative 2) and VAV option (Alternative 3) had near identical fan energy at 11-10%, cooling energy at 24-22%, and heating energy at 7%. The differential between these two systems came from a very small reduction in fan and cooling energy, allowing the VAV system to take a slight edge over the VRF. The heat pump option (Alternative 1) has the highest cooling energy at 41% due to the lower energy efficiency of these smaller units compared to the larger and more efficient options.

Figure 2. Annual Site Energy Consumption Breakdown



4.3 Life Cycle Cost Analysis Results

Figure 3. Life Cycle Cost Summary

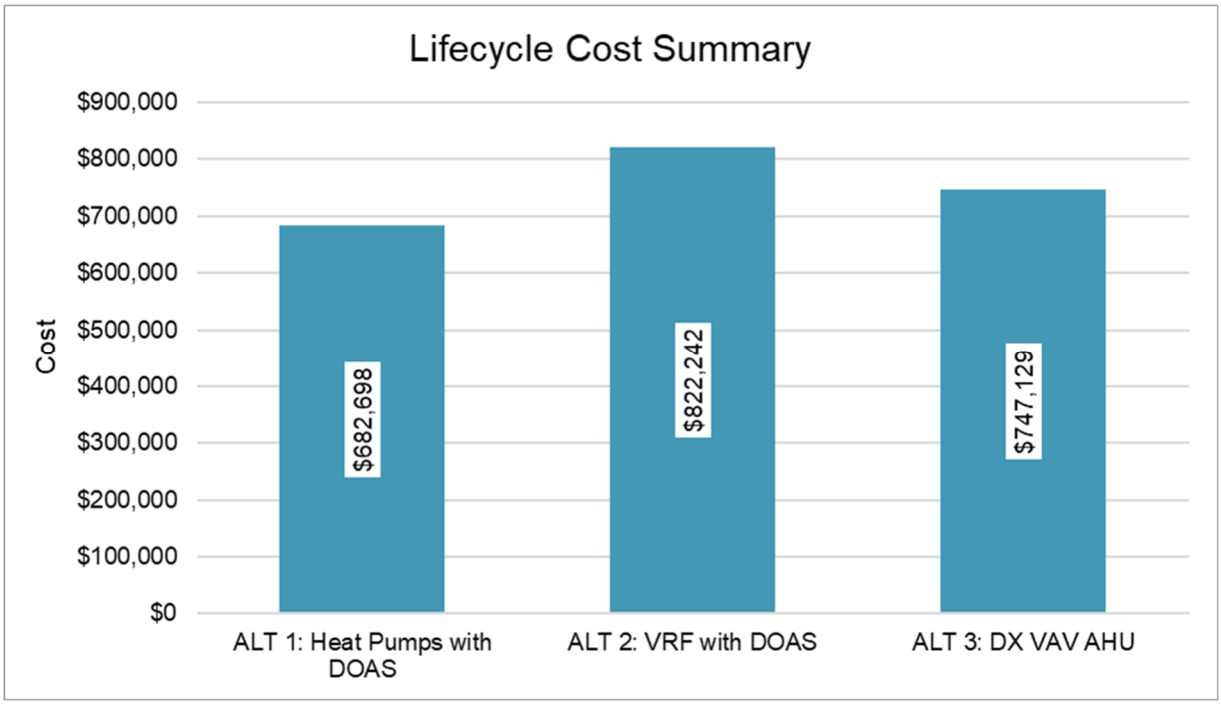


Table 3. Comparative Present Value Costs Alternatives

Overall Costs	ALT 1: Heat Pumps with DOAS	ALT 2: VRF with DOAS	ALT 3: DX VAV AHU	ALT 4: ASHRAE 90.1 BASELINE
First Cost	$ 104,860.00	$ 129,030.00	$ 143,966.00	$ -
Annual Energy Consumption (MMBTU)	228.9	188.3	183.9	247.3
Annual Energy Utility Cost	$ 5,358	$ 4,409	$ 4,306	$ 5,790
Energy Utility Cost (Over 40 Years)	$ 126,992	$ 104,496	$ 102,045	$ 137,226
Water/Drainage Usage Costs (Over 40 Years)	$ -	$ -	$ -	$ -
Annual Preventative Maintenance Cost (Over 40 Years)	$ 8,165	$ 12,052	$ 7,538	$ -
Replacement Costs (Over 40 Years)	$ 389,654	$ 435,393	$ 452,773	$ -
Salvage/Residual Value (After 40 Years)	$ (132,333)	$ (132,308)	$ (130,304)	$ -
Net Present Value LCC	$ 682,698	$ 822,242	$ 747,129	$ -
Lowest Overall Lifecycle Cost	-		X	

Table 3 - Comparative Present-Value Costs of Alternatives

While the heat pump option (Alternative 1) has the lowest life-cycle cost, it also has the lowest performance rating improvements and energy consumption against the baseline system (Table 4). As a result the heat pump option LCCA results were removed from consideration. Of the remaining two viable options the DX VAV AHU (Alternative 3) is the most life-cycle effective, approximately 10% less than the least effective VRF option (Alternative 2). It is important to note that the project is still under development and mechanical details used in this report will change during the design phase. The savings come from the higher maintenance costs of the VRF system.

Table 4. Performance Rating

Variable	Description	Energy Consumption Performance Rating			
		ALT 1: Heat Pumps with DOAS	ALT 2: VRF with DOAS	ALT 3: DX VAV AHU	ALT 4: ASHRAE 90.1 BASELINE
BBUEC ($)	Baseline Building Unregulated Energy Cost	1,836	1,836	1,836	1,836
	Baseline Building Regulated Energy Cost	4,688	4,688	4,688	4,688
	Baseline Building Performance Energy Cost	6,524	6,524	6,524	6,524
	Total Area Weighted Building Performance Factor	0.53	0.53	0.53	0.53
	Performance Cost Index Target	66%	66%	66%	66%
	Total Proposed Building Energy Cost	6,037	4,968	4,851	6,524
PCI	**Performance Cost Index**	93%	76%	74%	100%
Percent %	**Percentage Improvement**	**11.3%**	**36.0%**	**38.7%**	**0.0%**

Table 4 - Performance Rating

4.4 Results Discussion

The VAV option consumes the lowest overall energy, has the lowest life cycle cost (of the viable systems based on energy consumption), and has the highest performance rating improvement over the baseline system. It should be noted that these improvements are marginally better than the VRF option and either system would be suitable for serving the building.

However it is also worth considering local service support, and it is anticipated that local service contractors would be able to more effectively support a VAV system opposed to a Variable Refrigerant Flow system.

As a result of the energy analysis and life-cycle analysis, in addition to the anticipated service support of local contractors, it is recommended that the building mechanical design utilize the DX VAV AHU option (Alternative 3).

Appendix A

HVAC Comparison Inputs and Assumptions

September 6, 2024

Entered Values

TRACE® 700 version 6.3.4

By HDR

Project Name: PBA ACP - VCC
Dataset Name: C:\USERS\CHABY\ONEDRIVE - HDR, INC\PROJECTS\PINE BLUFF\TRACE\PINE BLUFFII.TRC
Location: White Hall, Arkansas
Building Owner: US Army
Program User: Cody Haby
Company: HDR
Comments:

Cooling Design Period:	January thru December
Peak Hour Override:	0
Daylight Savings Period:	
Summer Period:	
Cooling Methodology:	TETD-TA1
Heating Methodology:	UATD
Infiltration Methodology:	Vary with wind speed
Outside Film Methodology:	Vary with wind speed
Terrain Methodology:	Rural areas with low buildings, trees, etc.
Room Circ Rate:	Medium
Wall Load To Plenum:	YES
Building Orientation:	315 degrees from north
Simulation Hours:	Reduced year
Calendar Code:	Standard (1978)
Energy Simulation Period:	January thru December

Location:	Grider Field, Arkansas	
Summer Design Dry Bulb:	94.90	°F
Summer Design Wet Bulb:	77.30	°F
Winter Design Dry Bulb:	25.20	°F
Summer Clearness Number:	0.95	
Winter Clearness Number:	0.95	
Summer Ground Reflectance:	0.20	
Winter Ground Reflectance:	0.20	
Carbon Dioxide Level:	400	ppm

Force VAV Min => Nominal Ventilation at Design:	No
Allow Energy Recovery/Transfer at Design:	Yes
Retest Design Peaks:	Yes
Calculate Building Block Loads:	No

Close ventilation dampers during unoccupied hours: Yes

ENTERED VALUES
PLANTS

By HDR

Cooling Plant: SS

Sizing method: Peak
Heat rejection type: None
Secondary distribution pump: None
Secondary pump consumption: 0 Ft Water
Thermal storage type: None
Thermal storage capacity: 0 ton-hr
Thermal storage schedule: Off (0%)

Geothermal Loop

TLoop Ent Bldg: None
TLoop schedule: None
Flow rate: 100.00% of condenser flow rate
Loop pump None
Pump F.L. rate: 0.00ft water
Flow scheme: Fully mixed
Loop fluid glycol: 0%
Heat exchanger approach: 0°F

Equipment tag: Air-cooled unitary - 002

Cooling Type: 90.1-13 Min AC SS AllHeat <65 MBh

SS

Operating Mode	Capacity	Energy Rate
Cooling:		11.5000 Packaged EER
Heat recovery:		
Tank charging:		
Tank charging & heat recovery:		

Pumps	Type
Chilled water:	None
Condenser water:	None
Heat recovery or aux cond:	None
Free cooling:	None

Full Load Consumption

Heat Rejection and Thermal Storage

Heat rejection type: 90.1 Min Air Cooled Condenser
Thermal storage type: None
T-storage capacity: 0 ton-hr
T-storage schedule: Storage

Equipment Options

Sequencing type: Single
Demand lim priority:
Dsn chilled water delta T: 12 °F
Dsn cond water delta T: 0 °F
Free clg type: None
Fluid cooler type: None
Load shed econ: no
Evap precooling: no
Hot gas reheat No
Energy source:
Reject cond heat: Heat Reject.Equip
Cond. heat to plant:
Equip schedule: Available (100%)

Reset Based On	Reset Curve	Max Reset TD
Chilled Water: None	None	10,000°F
Condenser Water: None	None	0°F

Package energy breakout	Primary fan	Secondary fan	Exhaust fan	Optional ventilation fan	Condenser fan
Included in full load energy rate	Yes	No	No	No	Yes

Apply same fans for heat recovery energy breakout: No

Cooling Plant: DOAS

Sizing method: Peak
Heat rejection type: None
Secondary distribution pump: None
Secondary pump consumption: 0 Ft Water
Thermal storage type: None
Thermal storage capacity: 0 ton-hr
Thermal storage schedule: Off (0%)

Geothermal Loop

TLoop Ent Bldg: None
TLoop schedule: None
Flow rate: 100.00% of condenser flow rate
Loop pump None
Pump F.L. rate: 0.00ft water
Flow scheme: Fully mixed
Loop fluid glycol: 0%
Heat exchanger approach: 0°F

Equipment tag: Air-cooled unitary - 001

Cooling Type: 90.1-13 Min ACHP SS/SP Elec 65-135 MBh

DOAS

Operating Mode	Capacity	Energy Rate
Cooling:		13.0000 Packaged EER
Heat recovery:	14.4 Mbh/ton	3.3000 Packaged COP
Tank charging:		
Tank charging & heat recovery:		

Pumps	Type
Chilled water:	None
Condenser water:	None
Heat recovery or aux cond:	None
Free cooling:	None

Full Load Consumption

Heat Rejection and Thermal Storage

Equipment Options

ENTERED VALUES
PLANTS
By HDR

Heat rejection type: 90.1 Min Air Cooled Condenser
Thermal storage type: None
T-storage capacity: 0 ton-hr
T-storage schedule: Storage

Sequencing type: Single
Demand lim priority:
Dsn chilled water delta T: 12 °F
Dsn cond water delta T: 0 °F

Free clg type: None
Fluid cooler type: None
Load shed econ: no
Evap precooling: no
Hot gas reheat No

Energy source: DOAS HEAT
Reject cond heat: Heat Reject.Equip
Cond. heat to plant:
Equip schedule: Available (100%)

	Reset Based On	Reset Curve	Max Reset TD
Chilled Water:	None	None	0°F
Condenser Water:	None	None	0°F

Package energy breakout	Primary fan	Secondary fan	Exhaust fan	Optional ventilation fan	Condenser fan
Included in full load energy rate	Yes	No	No	No	Yes

Apply same fans for heat recovery energy breakout: Yes

Cooling Plant: HP

Sizing method: Peak
Heat rejection type: None
Secondary distribution pump: None
Secondary pump consumption: 0 Ft Water
Thermal storage type: None
Thermal storage capacity: 0 ton-hr
Thermal storage schedule: Off (0%)

Geothermal Loop

TLoop Ent Bldg: None
TLoop schedule: None
Flow rate: 100.00% of condenser flow rate
Loop pump None
Pump F.L. rate: 0.00ft water

Flow scheme: Fully mixed
Loop fluid glycol: 0%
Heat exchanger approach: 0°F

Equipment tag: Air-cooled unitary - 003

Cooling Type: 90.1-13 Min ACHP AllHeat SP < 65 MBh

HP

Operating Mode	Capacity	Energy Rate
Cooling:		8.8000 Packaged EER
Heat recovery:	14.4 Mbh/ton	3.0000 Packaged COP
Tank charging:		
Tank charging & heat recovery:		

Pumps	Type
Chilled water:	None
Condenser water:	None
Heat recovery or aux cond:	None
Free cooling:	None

Full Load Consumption

Heat Rejection and Thermal Storage

Heat rejection type: 90.1 Min Air Cooled Condenser
Thermal storage type: None
T-storage capacity: 0 ton-hr
T-storage schedule: Storage

Sequencing type: Single
Demand lim priority:
Dsn chilled water delta T: 12 °F
Dsn cond water delta T: 0 °F

Equipment Options

Free clg type: None
Fluid cooler type: None
Load shed econ: no
Evap precooling: no
Hot gas reheat No

Energy source: HP HEAT
Reject cond heat: Heat Reject.Equip
Cond. heat to plant:
Equip schedule: Available (100%)

	Reset Based On	Reset Curve	Max Reset TD
Chilled Water:	None	None	0°F
Condenser Water:	None	None	0°F

Package energy breakout	Primary fan	Secondary fan	Exhaust fan	Optional ventilation fan	Condenser fan
Included in full load energy rate	Yes	No	No	No	Yes

Apply same fans for heat recovery energy breakout: Yes

ENTERED VALUES
PLANTS
By HDR

Heating Plant: DOAS HEAT

Sizing method: Peak
Cogeneration type: None
Secondary distribution pump: None
Secondary pump consumption: 0 Ft Water
Thermal storage type: None
Thermal storage capacity: 0 ton-hr

Equipment tag: Electric Resistance - 002 Heating Type: Default electric resistance DOAS HEAT

Heating capacity:
Energy rate: 100.00 % Effic.

Thermal storage type: None
Thermal storage capacity: 0 ton-hr
Thermal storage schedule: Storage

Equipment schedule: Available (100%)
Demand limiting priority:

Heating Plant: HP HEAT

Sizing method: Peak
Cogeneration type: None
Secondary distribution pump: None
Secondary pump consumption: 0 Ft Water
Thermal storage type: None
Thermal storage capacity: 0 ton-hr

Equipment tag: Electric Resistance - 003 Heating Type: Default electric resistance HP HEAT

Heating capacity:
Energy rate: 100.00 % Effic.

Thermal storage type: None
Thermal storage capacity: 0 ton-hr
Thermal storage schedule: Storage

Equipment schedule: Available (100%)
Demand limiting priority:

Heating Plant: SS HEAT

Sizing method: Peak
Cogeneration type: None
Secondary distribution pump: None
Secondary pump consumption: 0 Ft Water
Thermal storage type: None
Thermal storage capacity: 0 ton-hr

Equipment tag: Electric Resistance - 001 Heating Type: Default electric resistance SS HEAT

Heating capacity:
Energy rate: 100.00 % Effic.

Thermal storage type: None
Thermal storage capacity: 0 ton-hr
Thermal storage schedule: Storage

Equipment schedule: Available (100%)
Demand limiting priority:

ENTERED VALUES
PLANTS
By HDR

Heating Plant: Unit Heater

Sizing method: Peak
Cogeneration type: None
Secondary distribution pump: None
Secondary pump consumption: 0 Ft Water
Thermal storage type: None
Thermal storage capacity: 0 ton-hr

Equipment tag: Electric Resistance - 004

Heating Type: Default electric resistance

Unit Heater

Heating capacity:
Energy rate: 100.00 % Effic.

Thermal storage type: None
Thermal storage capacity: 0 ton-hr
Thermal storage schedule: Storage

Equipment schedule: Available (100%)
Demand limiting priority:

Base Utilities

Plant assigned to: Stand-alone
Type: None
Description:
Demand limiting priority:
Schedule: Off (0%)
Hourly demand: 0.00 kW

Miscellaneous accessories

Plant assigned to: SS
Equipment tag: All
Type: None
Description:
Schedule: Off (0%)
Energy: 0.00 kW

ENTERED VALUES
PLANTS
By HDR

Cooling Plant: DOAS

Sizing method: Peak
Heat rejection type: None
Secondary distribution pump: None
Secondary pump consumption: 0 Ft Water
Thermal storage type: None
Thermal storage capacity: 0 ton-hr
Thermal storage schedule: Off (0%)

Geothermal Loop

TLoop Ent Bldg: None
TLoop schedule: None
Flow rate: 100.00% of condenser flow rate
Loop pump None
Pump F.L. rate: 0.00ft water
Flow scheme: Fully mixed
Loop fluid glycol: 0%
Heat exchanger approach: 0°F

Equipment tag: Air-cooled unitary - 001

Cooling Type: 90.1-13 Min ACHP SS/SP Elec 65-135 MBh

DOAS

Operating Mode	Capacity	Energy Rate
Cooling:		13.0000 Packaged EER
Heat recovery:	14.4 Mbh/ton	3.3000 Packaged COP
Tank charging:		
Tank charging & heat recovery:		

Pumps	Type
Chilled water:	None
Condenser water:	None
Heat recovery or aux cond:	None
Free cooling:	None

Full Load Consumption

Heat Rejection and Thermal Storage

Heat rejection type: 90.1 Min Air Cooled Condenser
Thermal storage type: None
T-storage capacity: 0 ton-hr
T-storage schedule: Storage

Equipment Options

Sequencing type: Single
Demand lim priority:
Dsn chilled water delta T: 12 °F
Dsn cond water delta T: 0 °F
Hourly ambient wet bulb offset: 33999999521443€
Free clg type: None
Fluid cooler type: None
Load shed econ: no
Evap precooling: no
Hot gas reheat No
Energy source: DOAS HEAT
Reject cond heat: Heat Reject.Equip
Cond. heat to plant:
Equip schedule: Available (100%)

Reset Based On	Reset Curve	Max Reset TD
Chilled Water: None	None	0°F
Condenser Water: None	None	0°F

Package energy breakout	Primary fan	Secondary fan	Exhaust fan	Optional ventilation fan	Condenser fan
Included in full load energy rate	Yes	No	No	No	Yes

Apply same fans for heat recovery energy breakout: Yes

Cooling Plant: VRF

Sizing method: Peak
Heat rejection type: None
Secondary distribution pump: None
Secondary pump consumption: 0 Ft Water
Thermal storage type: None
Thermal storage capacity: 0 ton-hr
Thermal storage schedule: Off (0%)

Geothermal Loop

TLoop Ent Bldg: None
TLoop schedule: None
Flow rate: 100.00% of condenser flow rate
Loop pump None
Pump F.L. rate: 0.00ft water
Flow scheme: Fully mixed
Loop fluid glycol: 0%
Heat exchanger approach: 0°F

Equipment tag: Air-cooled unitary - 002

Cooling Type: VRV IV Daikin AC Heat Recovery

VRF

Operating Mode	Capacity	Energy Rate
Cooling:		4.1000 Packaged COP
Heat recovery:	13.5 Mbh/ton	4.0000 Packaged COP
Tank charging:		
Tank charging & heat recovery:		

Pumps	Type
Chilled water:	None
Condenser water:	None
Heat recovery or aux cond:	None
Free cooling:	None

Full Load Consumption

Heat Rejection and Thermal Storage

Equipment Options

ENTERED VALUES
PLANTS
By HDR

Heat rejection type: Included In Compressor Power
Thermal storage type: None
T-storage capacity: 0 ton-hr
T-storage schedule: Storage

Sequencing type: Single
Demand lim priority:
Dsn chilled water delta T: 12 °F
Dsn cond water delta T: 0 °F

Free clg type: None
Fluid cooler type: None
Load shed econ: no
Evap precooling: no
Hot gas reheat No

Energy source: VRF HEAT
Reject cond heat: Heating plant
Cond. heat to plant: VRF HEAT
Equip schedule: Available (100%)

Reset Based On	Reset Curve	Max Reset TD
Chilled Water: None	None	10,000°F
Condenser Water: None	None	0°F

Package energy breakout	Primary fan	Secondary fan	Exhaust fan	Optional ventilation fan	Condenser fan
Included in full load energy rate	Yes	No	No	No	Yes

Apply same fans for heat recovery energy breakout: No

Cooling Plant: SS

Sizing method: Peak
Heat rejection type: None
Secondary distribution pump: None
Secondary pump consumption: 0 Ft Water
Thermal storage type: None
Thermal storage capacity: 0 ton-hr
Thermal storage schedule: Off (0%)

Geothermal Loop

TLoop Ent Bldg: None
TLoop schedule: None
Flow rate: 100.00% of condenser flow rate
Loop pump None
Pump F.L. rate: 0.00ft water

Flow scheme: Fully mixed
Loop fluid glycol: 0%
Heat exchanger approach: 0°F

Equipment tag: Air-cooled unitary - 004

Cooling Type: 90.1-13 Min AC SS AllHeat <65 MBh

SS

Operating Mode	Capacity	Energy Rate
Cooling:		11.5000 Packaged EER
Heat recovery:		
Tank charging:		
Tank charging & heat recovery:		

Pumps	Type
Chilled water:	None
Condenser water:	None
Heat recovery or aux cond:	None
Free cooling:	None

Full Load Consumption

Heat Rejection and Thermal Storage

Heat rejection type: 90.1 Min Air Cooled Condenser
Thermal storage type: None
T-storage capacity: 0 ton-hr
T-storage schedule: Storage

Sequencing type: Single
Demand lim priority:
Dsn chilled water delta T: 12 °F
Dsn cond water delta T: 0 °F

Equipment Options

Free clg type: None
Fluid cooler type: None
Load shed econ: no
Evap precooling: no
Hot gas reheat No

Energy source:
Reject cond heat: Heat Reject.Equip
Cond. heat to plant:
Equip schedule: Available (100%)

Reset Based On	Reset Curve	Max Reset TD
Chilled Water: None	None	10,000°F
Condenser Water: None	None	0°F

Package energy breakout	Primary fan	Secondary fan	Exhaust fan	Optional ventilation fan	Condenser fan
Included in full load energy rate	Yes	No	No	No	Yes

Apply same fans for heat recovery energy breakout: No

ENTERED VALUES
PLANTS
By HDR

Heating Plant: DOAS HEAT

Sizing method: Peak
Cogeneration type: None
Secondary distribution pump: None
Secondary pump consumption: 0 Ft Water
Thermal storage type: None
Thermal storage capacity: 0 ton-hr

Equipment tag: Electric Resistance - 001 — Heating Type: Default electric resistance — DOAS HEAT

Heating capacity:
Energy rate: 100.00 % Effic.

Thermal storage type: None
Thermal storage capacity: 0 ton-hr
Thermal storage schedule: Storage

Equipment schedule: Available (100%)
Demand limiting priority:

Heating Plant: SS HEAT

Sizing method: Peak
Cogeneration type: None
Secondary distribution pump: None
Secondary pump consumption: 0 Ft Water
Thermal storage type: None
Thermal storage capacity: 0 ton-hr

Equipment tag: Electric Resistance - 004 — Heating Type: Default electric resistance — SS HEAT

Heating capacity:
Energy rate: 100.00 % Effic.

Thermal storage type: None
Thermal storage capacity: 0 ton-hr
Thermal storage schedule: Storage

Equipment schedule: Available (100%)
Demand limiting priority:

Heating Plant: Unit Heater

Sizing method: Peak
Cogeneration type: None
Secondary distribution pump: None
Secondary pump consumption: 0 Ft Water
Thermal storage type: None
Thermal storage capacity: 0 ton-hr

Equipment tag: Electric Resistance - 003 — Heating Type: Default electric resistance — Unit Heater

Heating capacity:
Energy rate: 100.00 % Effic.

Thermal storage type: None
Thermal storage capacity: 0 ton-hr
Thermal storage schedule: Storage

Equipment schedule: Available (100%)
Demand limiting priority:

ENTERED VALUES
PLANTS
By HDR

Heating Plant: VRF HEAT

Sizing method: Peak
Cogeneration type: None
Secondary distribution pump: None
Secondary pump consumption: 0 Ft Water
Thermal storage type: None
Thermal storage capacity: 0 ton-hr

Equipment tag: Electric Resistance - 002

Heating Type: Default electric resistance

VRF HEAT

Heating capacity:
Energy rate: 100.00 % Effic.

Thermal storage type: None
Thermal storage capacity: 0 ton-hr
Thermal storage schedule: Storage

Equipment schedule: Available (100%)
Demand limiting priority:

Base Utilities

Plant assigned to: Stand-alone
Type: None
Description:
Demand limiting priority:
Schedule: Off (0%)
Hourly demand: 0.00 kW

Miscellaneous accessories

Plant assigned to: DOAS HEAT
Equipment tag: All
Type: None
Description:
Schedule: Off (0%)
Energy: 0.00 kW

ENTERED VALUES
PLANTS
By HDR

Cooling Plant: VAV DX

Sizing method: Peak
Heat rejection type: None
Secondary distribution pump: None
Secondary pump consumption: 0 Ft Water
Thermal storage type: None
Thermal storage capacity: 0 ton-hr
Thermal storage schedule: Off (0%)

Geothermal Loop

TLoop Ent Bldg: None
TLoop schedule: None
Flow rate: 100.00% of condenser flow rate
Loop pump None
Pump F.L. rate: 0.00ft water
Flow scheme: Fully mixed
Loop fluid glycol: 0%
Heat exchanger approach: 0°F

Equipment tag: Air-cooled unitary - 001 — Cooling Type: Air to Air HP — VAV DX

Operating Mode	Capacity	Energy Rate
Cooling:		11.0000 Packaged EER
Heat recovery:	14.4 Mbh/ton	0.0950 kW/Mbh
Tank charging:		
Tank charging & heat recovery:		

Pumps	Type
Chilled water:	None
Condenser water:	None
Heat recovery or aux cond:	None
Free cooling:	None

Full Load Consumption

Heat Rejection and Thermal Storage

Heat rejection type: Condenser fan for MZ rooftop
Thermal storage type: None
T-storage capacity: 0 ton-hr
T-storage schedule: Storage

Equipment Options

Sequencing type: Single
Demand lim priority:
Dsn chilled water delta T: 10 °F
Dsn cond water delta T: 10 °F

Free clg type: None
Fluid cooler type: None
Load shed econ: no
Evap precooling: no
Hot gas reheat No

Energy source: VAV HEAT
Reject cond heat: Heat Reject.Equip
Cond. heat to plant:
Equip schedule: Available (100%)

Reset Based On	Reset Curve	Max Reset TD
Chilled Water: None	None	0°F
Condenser Water: None	None	0°F

Package energy breakout	Primary fan	Secondary fan	Exhaust fan	Optional ventilation fan	Condenser fan
Included in full load energy rate	Yes	No	No	No	Yes

Apply same fans for heat recovery energy breakout: No

Cooling Plant: SS

Sizing method: Peak
Heat rejection type: None
Secondary distribution pump: None
Secondary pump consumption: 0 Ft Water
Thermal storage type: None
Thermal storage capacity: 0 ton-hr
Thermal storage schedule: Off (0%)

Geothermal Loop

TLoop Ent Bldg: None
TLoop schedule: None
Flow rate: 100.00% of condenser flow rate
Loop pump None
Pump F.L. rate: 0.00ft water
Flow scheme: Fully mixed
Loop fluid glycol: 0%
Heat exchanger approach: 0°F

Equipment tag: Air-cooled unitary - 003 — Cooling Type: 90.1-13 Min AC SS AllHeat <65 MBh — SS

Operating Mode	Capacity	Energy Rate
Cooling:		11.5000 Packaged EER
Heat recovery:		
Tank charging:		
Tank charging & heat recovery:		

Pumps	Type
Chilled water:	None
Condenser water:	None
Heat recovery or aux cond:	None
Free cooling:	None

Full Load Consumption

Heat Rejection and Thermal Storage

Equipment Options

ENTERED VALUES
PLANTS
By HDR

Heat rejection type: 90.1 Min Air Cooled Condenser
Thermal storage type: None
T-storage capacity: 0 ton-hr
T-storage schedule: Storage

Sequencing type: Single
Demand lim priority:
Dsn chilled water delta T: 12 °F
Dsn cond water delta T: 0 °F

Free clg type: None
Fluid cooler type: None
Load shed econ: no
Evap precooling: no
Hot gas reheat No

Energy source:
Reject cond heat: Heat Reject.Equip
Cond. heat to plant:
Equip schedule: Available (100%)

	Reset Based On	Reset Curve	Max Reset TD
Chilled Water:	None	None	10,000°F
Condenser Water:	None	None	0°F

Package energy breakout	Primary fan	Secondary fan	Exhaust fan	Optional ventilation fan	Condenser fan
Included in full load energy rate	Yes	No	No	No	Yes

Apply same fans for heat recovery energy breakout: No

Cooling Plant: HP

Sizing method: Peak
Heat rejection type: None
Secondary distribution pump: None
Secondary pump consumption: 0 Ft Water
Thermal storage type: None
Thermal storage capacity: 0 ton-hr
Thermal storage schedule: Off (0%)

Geothermal Loop

TLoop Ent Bldg: None
TLoop schedule: None
Flow rate: 100.00% of condenser flow rate
Loop pump None
Pump F.L. rate: 0.00ft water

Flow scheme: Fully mixed
Loop fluid glycol: 0%
Heat exchanger approach: 0°F

Equipment tag: Air-cooled unitary - 004

Cooling Type: 90.1-13 Min ACHP AllHeat SS < 65 MBh

HP

Operating Mode	Capacity	Energy Rate
Cooling:		11.7970 Packaged EER
Heat recovery:	14.4 Mbh/ton	3.3280 Packaged COP
Tank charging:		
Tank charging & heat recovery:		

Pumps	Type
Chilled water:	None
Condenser water:	None
Heat recovery or aux cond:	None
Free cooling:	None

Full Load Consumption

Heat Rejection and Thermal Storage

Heat rejection type: 90.1 Min Air Cooled Condenser
Thermal storage type: None
T-storage capacity: 0 ton-hr
T-storage schedule: Storage

Sequencing type: Single
Demand lim priority:
Dsn chilled water delta T: 12 °F
Dsn cond water delta T: 0 °F

Equipment Options

Free clg type: None
Fluid cooler type: None
Load shed econ: no
Evap precooling: no
Hot gas reheat No

Energy source: HP HEAT
Reject cond heat: Heat Reject.Equip
Cond. heat to plant:
Equip schedule: Available (100%)

	Reset Based On	Reset Curve	Max Reset TD
Chilled Water:	None	None	0°F
Condenser Water:	None	None	0°F

Package energy breakout	Primary fan	Secondary fan	Exhaust fan	Optional ventilation fan	Condenser fan
Included in full load energy rate	Yes	No	No	No	Yes

Apply same fans for heat recovery energy breakout: Yes

ENTERED VALUES
PLANTS
By HDR

Heating Plant: HP HEAT

Sizing method: Peak
Cogeneration type: None
Secondary distribution pump: None
Secondary pump consumption: 0 Ft Water
Thermal storage type: None
Thermal storage capacity: 0 ton-hr

Equipment tag: Electric Resistance - 003 Heating Type: Default electric resistance HP HEAT

Heating capacity:
Energy rate: 100.00 % Effic.

Thermal storage type: None
Thermal storage capacity: 0 ton-hr
Thermal storage schedule: Storage

Equipment schedule: Available (100%)
Demand limiting priority:

Heating Plant: SS HEAT

Sizing method: Peak
Cogeneration type: None
Secondary distribution pump: None
Secondary pump consumption: 0 Ft Water
Thermal storage type: None
Thermal storage capacity: 0 ton-hr

Equipment tag: Electric Resistance - 001 Heating Type: Default electric resistance SS HEAT

Heating capacity:
Energy rate: 100.00 % Effic.

Thermal storage type: None
Thermal storage capacity: 0 ton-hr
Thermal storage schedule: Storage

Equipment schedule: Available (100%)
Demand limiting priority:

Heating Plant: Unit Heater

Sizing method: Peak
Cogeneration type: None
Secondary distribution pump: None
Secondary pump consumption: 0 Ft Water
Thermal storage type: None
Thermal storage capacity: 0 ton-hr

Equipment tag: Electric Resistance - 004 Heating Type: Default electric resistance Unit Heater

Heating capacity:
Energy rate: 100.00 % Effic.

Thermal storage type: None
Thermal storage capacity: 0 ton-hr
Thermal storage schedule: Storage

Equipment schedule: Available (100%)
Demand limiting priority:

ENTERED VALUES
PLANTS

By HDR

Heating Plant: VAV HEAT

Sizing method: Peak
Cogeneration type: None
Secondary distribution pump: None
Secondary pump consumption: 0 Ft Water
Thermal storage type: None
Thermal storage capacity: 0 ton-hr

Equipment tag: Electric Resistance - 002

Heating Type: Default electric resistance

VAV HEAT

Heating capacity:
Energy rate: 100.00 % Effic.

Thermal storage type: None
Thermal storage capacity: 0 ton-hr
Thermal storage schedule: Storage

Equipment schedule: Available (100%)
Demand limiting priority:

Base Utilities

Plant assigned to: Stand-alone
Type: None

Description:
Demand limiting priority:

Schedule: Off (0%)
Hourly demand: 0.00 kW

Miscellaneous accessories

Plant assigned to: VAV HEAT
Equipment tag: All

Type: None
Description:

Schedule: Off (0%)
Energy: 0.00 kW

ENTERED VALUES
PLANTS
By HDR

Cooling Plant: RTU DX

Sizing method: Peak
Heat rejection type: None
Secondary distribution pump: None
Secondary pump consumption: 0 Ft Water
Thermal storage type: None
Thermal storage capacity: 0 ton-hr
Thermal storage schedule: Off (0%)

Geothermal Loop

TLoop Ent Bldg: None
TLoop schedule: None
Flow rate: 100.00% of condenser flow rate
Loop pump None
Pump F.L. rate: 0.00ft water
Flow scheme: Fully mixed
Loop fluid glycol: 0%
Heat exchanger approach: 0°F

Equipment tag: Air-cooled unitary - 001 — Cooling Type: Air to Air HP — RTU DX

Operating Mode	Capacity	Energy Rate
Cooling:		11.0000 Packaged EER
Heat recovery:	14.4 Mbh/ton	0.0950 kW/Mbh
Tank charging:		
Tank charging & heat recovery:		

Pumps	Type
Chilled water:	None
Condenser water:	None
Heat recovery or aux cond:	None
Free cooling:	None

Full Load Consumption

Heat Rejection and Thermal Storage

Heat rejection type: Condenser fan for MZ rooftop
Thermal storage type: None
T-storage capacity: 0 ton-hr
T-storage schedule: Storage

Equipment Options

Sequencing type: Single
Demand lim priority:
Dsn chilled water delta T: 10 °F
Dsn cond water delta T: 10 °F

Free clg type: None
Fluid cooler type: None
Load shed econ: no
Evap precooling: no
Hot gas reheat Yes

Energy source: RTU HEAT
Reject cond heat: Heating plant
Cond. heat to plant: RTU HEAT
Equip schedule: Available (100%)

Reset Based On	Reset Curve	Max Reset TD
Chilled Water: None	None	0°F
Condenser Water: None	None	0°F

Package energy breakout	Primary fan	Secondary fan	Exhaust fan	Optional ventilation fan	Condenser fan
Included in full load energy rate	No	No	No	No	No

Apply same fans for heat recovery energy breakout: No

Cooling Plant: SS

Sizing method: Peak
Heat rejection type: None
Secondary distribution pump: None
Secondary pump consumption: 0 Ft Water
Thermal storage type: None
Thermal storage capacity: 0 ton-hr
Thermal storage schedule: Off (0%)

Geothermal Loop

TLoop Ent Bldg: None
TLoop schedule: None
Flow rate: 100.00% of condenser flow rate
Loop pump None
Pump F.L. rate: 0.00ft water
Flow scheme: Fully mixed
Loop fluid glycol: 0%
Heat exchanger approach: 0°F

Equipment tag: Air-cooled unitary - 002 — Cooling Type: 90.1-13 Min AC SS AllHeat <65 MBh — SS

Operating Mode	Capacity	Energy Rate
Cooling:		11.5000 Packaged EER
Heat recovery:		
Tank charging:		
Tank charging & heat recovery:		

Pumps	Type
Chilled water:	None
Condenser water:	None
Heat recovery or aux cond:	None
Free cooling:	None

Full Load Consumption

Heat Rejection and Thermal Storage

Equipment Options

ENTERED VALUES
PLANTS
By HDR

Heat rejection type: 90.1 Min Air Cooled Condenser
Thermal storage type: None
T-storage capacity: 0 ton-hr
T-storage schedule: Storage

Sequencing type: Single
Demand lim priority:
Dsn chilled water delta T: 12 °F
Dsn cond water delta T: 0 °F

Free clg type: None
Fluid cooler type: None
Load shed econ: no
Evap precooling: no
Hot gas reheat No

Energy source:
Reject cond heat: Heat Reject.Equip
Cond. heat to plant:
Equip schedule: Available (100%)

Reset Based On	Reset Curve	Max Reset TD
Chilled Water: None	None	10,000°F
Condenser Water: None	None	0°F

Package energy breakout	Primary fan	Secondary fan	Exhaust fan	Optional ventilation fan	Condenser fan
Included in full load energy rate	Yes	No	No	No	Yes

Apply same fans for heat recovery energy breakout: No

Cooling Plant: HP

Sizing method: Peak
Heat rejection type: None
Secondary distribution pump: None
Secondary pump consumption: 0 Ft Water
Thermal storage type: None
Thermal storage capacity: 0 ton-hr
Thermal storage schedule: Off (0%)

Geothermal Loop

TLoop Ent Bldg: None
TLoop schedule: None
Flow rate: 100.00% of condenser flow rate
Loop pump None
Pump F.L. rate: 0.00ft water

Flow scheme: Fully mixed
Loop fluid glycol: 0%
Heat exchanger approach: 0°F

Equipment tag: Air-cooled unitary - 003

Cooling Type: 90.1-13 Min ACHP AllHeat SP < 65 MBh

HP

Operating Mode	Capacity	Energy Rate
Cooling:		8.8000 Packaged EER
Heat recovery:	14.4 Mbh/ton	3.0000 Packaged COP
Tank charging:		
Tank charging & heat recovery:		

Pumps	Type
Chilled water:	None
Condenser water:	None
Heat recovery or aux cond:	None
Free cooling:	None

Full Load Consumption

Heat Rejection and Thermal Storage

Heat rejection type: 90.1 Min Air Cooled Condenser
Thermal storage type: None
T-storage capacity: 0 ton-hr
T-storage schedule: Storage

Sequencing type: Single
Demand lim priority:
Dsn chilled water delta T: 12 °F
Dsn cond water delta T: 0 °F
Hourly ambient wet bulb offset: 33999999521443€

Free clg type: None
Fluid cooler type: None
Load shed econ: no
Evap precooling: no
Hot gas reheat No

Equipment Options

Energy source: HP HEAT
Reject cond heat: Heat Reject.Equip
Cond. heat to plant:
Equip schedule: Available (100%)

Reset Based On	Reset Curve	Max Reset TD
Chilled Water: None	None	0°F
Condenser Water: None	None	0°F

Package energy breakout	Primary fan	Secondary fan	Exhaust fan	Optional ventilation fan	Condenser fan
Included in full load energy rate	Yes	No	No	No	Yes

Apply same fans for heat recovery energy breakout: Yes

ENTERED VALUES
PLANTS
By HDR

Heating Plant: HP HEAT

Sizing method: Peak
Cogeneration type: None
Secondary distribution pump: None
Secondary pump consumption: 0 Ft Water
Thermal storage type: None
Thermal storage capacity: 0 ton-hr

Equipment tag: Electric Resistance - 003 Heating Type: Default electric resistance HP HEAT

Heating capacity:
Energy rate: 100.00 % Effic.

Thermal storage type: None
Thermal storage capacity: 0 ton-hr
Thermal storage schedule: Storage

Equipment schedule: Available (100%)
Demand limiting priority:

Heating Plant: RTU HEAT

Sizing method: Peak
Cogeneration type: None
Secondary distribution pump: None
Secondary pump consumption: 0 Ft Water
Thermal storage type: None
Thermal storage capacity: 0 ton-hr

Equipment tag: Electric Resistance - 001 Heating Type: Default electric resistance RTU HEAT

Heating capacity:
Energy rate: 100.00 % Effic.

Thermal storage type: None
Thermal storage capacity: 0 ton-hr
Thermal storage schedule: Storage

Equipment schedule: Available (100%)
Demand limiting priority:

Heating Plant: SS HEAT

Sizing method: Peak
Cogeneration type: None
Secondary distribution pump: None
Secondary pump consumption: 0 Ft Water
Thermal storage type: None
Thermal storage capacity: 0 ton-hr

Equipment tag: Electric Resistance - 002 Heating Type: Default electric resistance SS HEAT

Heating capacity:
Energy rate: 100.00 % Effic.

Thermal storage type: None
Thermal storage capacity: 0 ton-hr
Thermal storage schedule: Storage

Equipment schedule: Available (100%)
Demand limiting priority:

ENTERED VALUES
PLANTS

By HDR

Heating Plant: Unit Heater

Sizing method: Peak
Cogeneration type: None
Secondary distribution pump: None
Secondary pump consumption: 0 Ft Water
Thermal storage type: None
Thermal storage capacity: 0 ton-hr

Equipment tag: Electric Resistance - 006

Heating Type: Default electric resistance

Unit Heater

Heating capacity:
Energy rate: 100.00 % Effic.

Thermal storage type: None
Thermal storage capacity: 0 ton-hr
Thermal storage schedule: Storage

Equipment schedule: Available (100%)
Demand limiting priority:

Base Utilities

Plant assigned to: Stand-alone
Type: None
Description:
Demand limiting priority:
Schedule: Off (0%)
Hourly demand: 0.00 kW

Miscellaneous accessories

Plant assigned to: RTU DX
Equipment tag: All
Type: None
Description:
Schedule: Off (0%)
Energy: 0.00 kW

SYSTEM ENTERED VALUES

By HDR

SS-1 - Incremental Heat Pump

Design Air Conditions

	Max	Min				
Cooling supply:			Supply duct temperature diff:	0.0 °F	Design humidity ratio diff:	
Leaving cooling coil:			Reheat Temperature diff:	0.0 °F	Min room relative humidity:	
Heating supply:						

Advanced Options

Cooling coil sizing method:	Peak	Supply fan motor location:	Supply	Night purge schedule:	Off (0%)
Cooling coil location:	Room	Return fan motor location:	Omit	Optimum start schedule:	Off (0%)
Block cooling airflow:		Supply fan cofiguration:	Blow Thru	Optimum stop schedule:	Off (0%)
Ventilation deck location:	Return/Outdoor Deck	Supply fan sizing:	Peak		
Supply duct location:	Return Air	Fan mechanical efficiency :	75%	CO2-based DCV:	None
Return air path:	ROOMDK	Apply Std62 People Avg:	No		
		Std62 Max Vent (Z) Ratio:		System ventilation flag:	Sum Room OA Reqs

Reset per worst case room schedule:	Off (0%)		Supply air path / duct location:	Return Air
Max reset:			Space convective gains to occupied layer:	100 %
Use system default outside air reset:	Yes		Underfloor plenum height:	
			Conductive resistance of raised floor:	0.8 hr·ft²·°F/Btu
			Upstream nominal leakage fraction:	0 %
			Downstream constant leakage fraction:	0 %
	Control Method	Control Type	Aux cooling coil losses to plenum:	0 %
Auxiliary cooling coil	Activate After Primary System	None		
Auxiliary heating coil	Activate After Primary System	None		
Auxiliary fan	No Fan			

Coils

	Capacity	Schedule	Diversity	
Main cooling:	100.0 % of Design Capacity by adjusting a	Available (100%)	People	100%
Aux cooling:		Available (100%)	Lights	100%
Main heating:	100.0 % of Design Capacity	Available (100%)	Misc loads	100%
Aux heating:		Available (100%)		
Preheat:	100.0% of Design Capacity	Available (100%)		
Reheat:	100.0 % of Design Capacity	Available (100%)		
Humidification:	100.0 % of Design Capacity	Available (100%)		

Fans

	Type	Static Press.	90.1 SP Adj	Full Load Energy Rate	Schedule		Efficiency	Priority
Primary	Fan coil supply fan	0.1 in. wg	0.0 in. wg	0.00024 kW/Cfm	Available (100%)		90	
Secondary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)		85	
Return	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)		90	
System Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)		90	
Room Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)		85	
Optional ventilation	None	0.0 in. wg	NA	0.00000 kW	Available (100%)		90	
Auxiliary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)		85	
Fan Cycling					Cycle with all loads	0.0 ft		

SYSTEM ENTERED VALUES

By HDR

SS-2 - Incremental Heat Pump

Design Air Conditions

	Max	Min				
Cooling supply:			Supply duct temperature diff:	0.0 °F	Design humidity ratio diff:	
Leaving cooling coil:			Reheat Temperature diff:	0.0 °F	Min room relative humidity:	
Heating supply:						

Advanced Options

Cooling coil sizing method:	Peak	Supply fan motor location:	Supply	Night purge schedule:	Off (0%)
Cooling coil location:	Room	Return fan motor location:	Omit	Optimum start schedule:	Off (0%)
Block cooling airflow:		Supply fan cofiguration:	Blow Thru	Optimum stop schedule:	Off (0%)
Ventilation deck location:	Return/Outdoor Deck	Supply fan sizing:	Peak		
Supply duct location:	Return Air	Fan mechanical efficiency :	75%	CO2-based DCV:	None
Return air path:	ROOMDK	Apply Std62 People Avg:	No		
		Std62 Max Vent (Z) Ratio:		System ventilation flag:	Sum Room OA Reqs

Reset per worst case room schedule:	Off (0%)		Supply air path / duct location:	Return Air
Max reset:			Space convective gains to occupied layer:	100 %
Use system default outside air reset:	Yes		Underfloor plenum height:	
			Conductive resistance of raised floor:	0.8 hr·ft²·°F/Btu
			Upstream nominal leakage fraction:	0 %
			Downstream constant leakage fraction:	0 %
	Control Method	Control Type	Aux cooling coil losses to plenum:	0 %
Auxiliary cooling coil	Activate After Primary System	None		
Auxiliary heating coil	Activate After Primary System	None		
Auxiliary fan	No Fan			

Coils

	Capacity	Schedule	Diversity	
Main cooling:	100.0 % of Design Capacity by adjusting a	Available (100%)	People	100%
Aux cooling:		Available (100%)	Lights	100%
Main heating:	100.0 % of Design Capacity	Available (100%)	Misc loads	100%
Aux heating:		Available (100%)		
Preheat:	100.0% of Design Capacity	Available (100%)		
Reheat:	100.0 % of Design Capacity	Available (100%)		
Humidification:	100.0 % of Design Capacity	Available (100%)		

Fans

	Type	Static Press.	90.1 SP Adj	Full Load Energy Rate	Schedule		Efficiency	Priority
Primary	Fan coil supply fan	0.1 in. wg	0.0 in. wg	0.00024 kW/Cfm	Available (100%)		90	
Secondary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)		85	
Return	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)		90	
System Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)		90	
Room Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)		85	
Optional ventilation	None	0.0 in. wg	NA	0.00000 kW	Available (100%)		90	
Auxiliary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)		85	
Fan Cycling					Cycle with all loads	0.0 ft		

SYSTEM ENTERED VALUES

By HDR

HEAT PUMPS - Incremental Heat Pump

Design Air Conditions

	Max	Min
Cooling supply:		
Leaving cooling coil:		
Heating supply:	90.0 °F	

Supply duct temperature diff: 0.0 °F
Reheat Temperature diff: 0.0 °F
Design humidity ratio diff:
Min room relative humidity:

Optional Ventilation

Configuration: Dehumidify and Reheat / Heat
Control method: Fixed Setpoints
Deck location: Room Direct
Level location:

Cooling SADB: 72 °F
Heating SADB: 70 °F
Cooling SADP: 50 °F

Cooling SADB hi limit:
Cooling SADB low limit:
Cooling SADP hi limit:
Cooling SADP low limit:

Cooling schedule: Available (100%)
Heating schedule: Available (100%)

Stage 1 Exhaust Air Heat Recovery

Type: Fixed-plate HX (OA preconditioning)
Sup-side deck: Ventilation upstream
Exh-side deck: System exhaust
Schedule: Available (100%)

Sensible

Clg effectiveness at 100% airflow: 64%
Clg effectiveness at 75% airflow: 65%
Htg effectiveness at 100% airflow: 66%
HTg effectiveness at 75% airflow: 67%

Latent

Clg effectiveness at 100% airflow: 0%
Clg effectiveness at 75% airflow: 0%
Htg effectiveness at 100% airflow: 0%
HTg effectiveness at 75% airflow: 0%

Supply Side Options

Design air leaving dry bulb:
Design air leaving humidity ratio:
Coolant type: N/A
Coolant approach: N/A

Economizer lockout: Yes
Part load control: Modulated
Static pressure drop: 0.9 in. wg
Bypass dampers: No

Parasitic energy: 0.0 kW

Exhaust Side Options

Heat source: 200 °F
Fan static pressure : 0.0 in. wg
Fan static pressure drop: 0.9 in. wg
Integral heat recovery: No
Bypass dampers: Yes

Frost prevention

Type: Variable effectiveness
Set point: 40 °F
OA threshhold: 30 °F

Evap precooler

Type: None
Default Eff:
Dry Eff:
Max OA:
Min OA:
Swovr Oadb:
Drift Fraction:
Blowdown Rat::
Circ Pump:

Advanced Options

Cooling coil sizing method: Peak
Cooling coil location: Room
Block cooling airflow:
Ventilation deck location: Room Direct
Supply duct location: Return Air
Return air path: DUCTED

Supply fan motor location: Supply
Return fan motor location: Omit
Supply fan cofiguration: Blow Thru
Supply fan sizing: Peak
Fan mechanical efficiency : 75%
Apply Std62 People Avg: No
Std62 Max Vent (Z) Ratio:

Night purge schedule: Off (0%)
Optimum start schedule: Available (100%)
Optimum stop schedule: Off (0%)

CO2-based DCV: None

System ventilation flag: Sum Room OA Reqs

Reset per worst case room schedule: Off (0%)
Max reset:
Use system default outside air reset: Yes

Supply air path / duct location: Return Air
Space convective gains to occupied layer: 100 %
Underfloor plenum height:
Conductive resistance of raised floor: 0.8 hr·ft²·°F/Btu
Upstream nominal leakage fraction: 0 %
Downstream constant leakage fraction: 0 %
Aux cooling coil losses to plenum: 0 %

	Control Method	Control Type
Auxiliary cooling coil	Activate After Primary System	None
Auxiliary heating coil	Activate After Primary System	None
Auxiliary fan	No Fan	

SYSTEM ENTERED VALUES

By HDR

HEAT PUMPS - Incremental Heat Pump

Coils	Capacity	Schedule	Diversity	
Main cooling:	100.0 % of Design Capacity by adjusting a	Available (100%)	People	100%
Aux cooling:		Available (100%)	Lights	100%
Main heating:	100.0 % of Design Capacity	Available (100%)	Misc loads	100%
Aux heating:		Available (100%)		
Preheat:	100.0% of Design Capacity	Available (100%)		
Reheat:	100.0 % of Design Capacity	Available (100%)		
Humidification:	100.0 % of Design Capacity	Available (100%)		

Fans	Type	Static Press.	90.1 SP Adj	Full Load Energy Rate	Schedule	Efficiency	Priority
Primary	Fan coil supply fan	0.5 in. wg	0.0 in. wg	0.00024 kW/Cfm	Available (100%)	90	
Secondary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)	85	
Return	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	90	
System Exhaust	FC Centrifugal const vol	0.2 in. wg	0.0 in. wg	0.00032 kW/Cfm-in wg	Available (100%)	90	
Room Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	85	
Optional ventilation	BI Centrifugal const vol	2.0 in. wg	NA	0.00024 kW/Cfm-in wg	Available (100%)	90	
Auxiliary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)	85	
Fan Cycling					Cycle with occupancy 0.0 ft		

SYSTEM ENTERED VALUES

By HDR

UH-1 - Unit Heaters

Design Air Conditions

	Max	Min				
Cooling supply:			Supply duct temperature diff:	0.0 °F	Design humidity ratio diff:	
Leaving cooling coil:			Reheat Temperature diff:	0.0 °F	Min room relative humidity:	
Heating supply:						

Advanced Options

Cooling coil sizing method:	No Coil	Supply fan motor location:	Supply	Night purge schedule:	Off (0%)
Cooling coil location:	Room	Return fan motor location:	Omit	Optimum start schedule:	Off (0%)
Block cooling airflow:		Supply fan cofiguration:	Draw Thru	Optimum stop schedule:	Off (0%)
Ventilation deck location:	Return/Outdoor Deck	Supply fan sizing:	No Fan		
Supply duct location:	Return Air	Fan mechanical efficiency :	75%	CO2-based DCV:	None
Return air path:	ROOMDK	Apply Std62 People Avg:	No		
		Std62 Max Vent (Z) Ratio:		System ventilation flag:	Sum Room OA Reqs

Reset per worst case room schedule:	Off (0%)		Supply air path / duct location:	Return Air
Max reset:			Space convective gains to occupied layer:	100 %
Use system default outside air reset:	Yes		Underfloor plenum height:	
			Conductive resistance of raised floor:	0.8 hr·ft²·°F/Btu
			Upstream nominal leakage fraction:	0 %
			Downstream constant leakage fraction:	0 %
	Control Method	Control Type	Aux cooling coil losses to plenum:	0 %
Auxiliary cooling coil	Activate After Primary System	None		
Auxiliary heating coil	Activate After Primary System	None		
Auxiliary fan	No Fan			

Coils

	Capacity	Schedule	Diversity	
Main cooling:	0.0 % of Design Capacity by adjusting airfl	Available (100%)	People	100%
Aux cooling:		Available (100%)	Lights	100%
Main heating:	100.0 % of Design Capacity	Available (100%)	Misc loads	100%
Aux heating:		Available (100%)		
Preheat:	100.0% of Design Capacity	Available (100%)		
Reheat:	100.0 % of Design Capacity	Available (100%)		
Humidification:	100.0 % of Design Capacity	Available (100%)		

Fans

	Type	Static Press.	90.1 SP Adj	Full Load Energy Rate	Schedule	Efficiency	Priority
Primary	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	90	
Secondary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)	85	
Return	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	90	
System Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	90	
Room Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	85	
Optional ventilation	None	0.0 in. wg	NA	0.00000 kW	Available (100%)	90	
Auxiliary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)	85	
Fan Cycling					Cycle with heating loads only 0.0 ft		

SYSTEM ENTERED VALUES

By HDR

UH-2 - Unit Heaters

Design Air Conditions

	Max	Min				
Cooling supply:			Supply duct temperature diff:	0.0 °F	Design humidity ratio diff:	
Leaving cooling coil:			Reheat Temperature diff:	0.0 °F	Min room relative humidity:	
Heating supply:						

Advanced Options

Cooling coil sizing method:	No Coil	Supply fan motor location:	Supply	Night purge schedule:	Off (0%)
Cooling coil location:	Room	Return fan motor location:	Omit	Optimum start schedule:	Off (0%)
Block cooling airflow:		Supply fan cofiguration:	Draw Thru	Optimum stop schedule:	Off (0%)
Ventilation deck location:	Return/Outdoor Deck	Supply fan sizing:	No Fan		
Supply duct location:	Return Air	Fan mechanical efficiency :	75%	CO2-based DCV:	None
Return air path:	ROOMDK	Apply Std62 People Avg:	No		
		Std62 Max Vent (Z) Ratio:		System ventilation flag:	Sum Room OA Reqs

Reset per worst case room schedule:	Off (0%)	Supply air path / duct location:	Return Air
Max reset:		Space convective gains to occupied layer:	100 %
Use system default outside air reset:	Yes	Underfloor plenum height:	
		Conductive resistance of raised floor:	0.8 hr·ft²·°F/Btu
		Upstream nominal leakage fraction:	0 %
		Downstream constant leakage fraction:	0 %
		Aux cooling coil losses to plenum:	0 %

	Control Method	Control Type
Auxiliary cooling coil	Activate After Primary System	None
Auxiliary heating coil	Activate After Primary System	None
Auxiliary fan	No Fan	

Coils

	Capacity	Schedule	Diversity	
Main cooling:	0.0 % of Design Capacity by adjusting airfl	Available (100%)	People	100%
Aux cooling:		Available (100%)	Lights	100%
Main heating:	100.0 % of Design Capacity	Available (100%)	Misc loads	100%
Aux heating:		Available (100%)		
Preheat:	100.0% of Design Capacity	Available (100%)		
Reheat:	100.0 % of Design Capacity	Available (100%)		
Humidification:	100.0 % of Design Capacity	Available (100%)		

Fans

	Type	Static Press.	90.1 SP Adj	Full Load Energy Rate	Schedule	Efficiency	Priority
Primary	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	90	
Secondary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)	85	
Return	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	90	
System Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	90	
Room Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	85	
Optional ventilation	None	0.0 in. wg	NA	0.00000 kW	Available (100%)	90	
Auxiliary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)	85	
Fan Cycling					Cycle with heating loads only 0.0 ft		

SYSTEM ENTERED VALUES

By HDR

VRF - Variable Refrigerant Flow

Design Air Conditions

	Max	Min				
Cooling supply:			Supply duct temperature diff:	0.0 °F	Design humidity ratio diff:	
Leaving cooling coil:			Reheat Temperature diff:	0.0 °F	Min room relative humidity:	
Heating supply:	90.0 °F					

Optional Ventilation

Configuration: Dehumidify and Reheat / Heat	Cooling SADB: 72 °F	Cooling SADB hi limit:	Cooling schedule: Available (100%)
Control method: Fixed Setpoints	Heating SADB: 70 °F	Cooling SADB low limit:	Heating schedule: Available (100%)
Deck location: Room Direct	Cooling SADP: 50 °F	Cooling SADP hi limit:	
Level location:		Cooling SADP low limit:	

Stage 1 Exhaust Air Heat Recovery

Type: Fixed-plate HX (OA preconditioning) Sup-side deck: Ventilation upstream Exh-side deck: System exhaust Schedule: Available (100%)

Sensible

Clg effectiveness at 100% airflow:	64%	Htg effectiveness at 100% airflow:	66%
Clg effectiveness at 75% airflow:	65%	HTg effectiveness at 75% airflow:	67%

Latent

Clg effectiveness at 100% airflow:	0%	Htg effectiveness at 100% airflow:	0%
Clg effectiveness at 75% airflow:	0%	HTg effectiveness at 75% airflow:	0%

Supply Side Options

Design air leaving dry bulb:		Economizer lockout:	Yes
Design air leaving humidity ratio:		Part load control:	Modulated
Coolant type:	N/A	Static pressure drop:	0.9 in. wg
Coolant approach:	N/A	Bypass dampers:	No

Parasitic energy: 0.0 kW

Exhaust Side Options

Heat source:	200 °F
Fan static pressure :	0.0 in. wg
Fan static pressure drop:	0.9 in. wg
Integral heat recovery:	No
Bypass dampers:	Yes

Frost prevention

Type:	Variable effectiveness
Set point:	40 °F
OA threshhold:	30 °F

Evap precooler

Type:	None
Default Eff:	
Dry Eff:	
Max OA:	
Min OA:	
Swovr Oadb:	
Drift Fraction:	
Blowdown Rat::	
Circ Pump:	

Advanced Options

Cooling coil sizing method:	Block	Supply fan motor location:	Supply	Night purge schedule:	Off (0%)
Cooling coil location:	Zone	Return fan motor location:	Omit	Optimum start schedule:	Available (100%)
Block cooling airflow:		Supply fan cofiguration:	Blow Thru	Optimum stop schedule:	Off (0%)
Ventilation deck location:	Room Direct	Supply fan sizing:	Peak		
Supply duct location:	Return Air	Fan mechanical efficiency :	75%	CO2-based DCV:	None
Return air path:	DUCTED	Apply Std62 People Avg:	No		
		Std62 Max Vent (Z) Ratio:		System ventilation flag:	Sum Room OA Reqs

Reset per worst case room schedule:	Off (0%)		Supply air path / duct location:	Return Air
Max reset:			Space convective gains to occupied layer:	100 %
Use system default outside air reset:	Yes		Underfloor plenum height:	
			Conductive resistance of raised floor:	0.8 hr·ft²·°F/Btu
			Upstream nominal leakage fraction:	0 %
			Downstream constant leakage fraction:	0 %
			Aux cooling coil losses to plenum:	0 %

	Control Method	Control Type
Auxiliary cooling coil	Activate After Primary System	None
Auxiliary heating coil	Activate After Primary System	None
Auxiliary fan	No Fan	

SYSTEM ENTERED VALUES

By HDR

VRF - Variable Refrigerant Flow

Coils	Capacity	Schedule	Diversity	
Main cooling:	100.0 % of Design Capacity by adjusting a	Available (100%)	People	100%
Aux cooling:		Available (100%)	Lights	100%
Main heating:	100.0 % of Design Capacity	Available (100%)	Misc loads	100%
Aux heating:		Available (100%)		
Preheat:	100.0% of Design Capacity	Available (100%)		
Reheat:	100.0 % of Design Capacity	Available (100%)		
Humidification:	100.0 % of Design Capacity	Available (100%)		

Fans	Type	Static Press.	90.1 SP Adj	Full Load Energy Rate	Schedule	Efficiency	Priority
Primary	Fan coil supply fan	0.5 in. wg	0.0 in. wg	0.00024 kW/Cfm	Available (100%)	90	
Secondary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)	85	
Return	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	90	
System Exhaust	FC Centrifugal const vol	0.2 in. wg	0.0 in. wg	0.00032 kW/Cfm-in wg	Available (100%)	90	
Room Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	85	
Optional ventilation	BI Centrifugal const vol	2.0 in. wg	NA	0.00024 kW/Cfm-in wg	Available (100%)	90	
Auxiliary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)	85	
Fan Cycling					Cycle with occupancy 0.0 ft		

SYSTEM ENTERED VALUES

By HDR

UH-1 - Unit Heaters

Design Air Conditions

	Max	Min				
Cooling supply:			Supply duct temperature diff:	0.0 °F	Design humidity ratio diff:	
Leaving cooling coil:			Reheat Temperature diff:	0.0 °F	Min room relative humidity:	
Heating supply:						

Advanced Options

Cooling coil sizing method:	No Coil	Supply fan motor location:	Supply	Night purge schedule:	Off (0%)
Cooling coil location:	Room	Return fan motor location:	Omit	Optimum start schedule:	Off (0%)
Block cooling airflow:		Supply fan cofiguration:	Blow Thru	Optimum stop schedule:	Off (0%)
Ventilation deck location:	Return/Outdoor Deck	Supply fan sizing:	No Fan		
Supply duct location:	Return Air	Fan mechanical efficiency :	75%	CO2-based DCV:	None
Return air path:	ROOMDK	Apply Std62 People Avg:	No		
		Std62 Max Vent (Z) Ratio:		System ventilation flag:	Sum Room OA Reqs

Reset per worst case room schedule:	Off (0%)		Supply air path / duct location:	Return Air
Max reset:			Space convective gains to occupied layer:	100 %
Use system default outside air reset:	Yes		Underfloor plenum height:	
			Conductive resistance of raised floor:	0.8 hr·ft²·°F/Btu
			Upstream nominal leakage fraction:	0 %
			Downstream constant leakage fraction:	0 %
	Control Method	Control Type	Aux cooling coil losses to plenum:	0 %
Auxiliary cooling coil	Activate After Primary System	None		
Auxiliary heating coil	Activate After Primary System	None		
Auxiliary fan	No Fan			

Coils

	Capacity	Schedule	Diversity	
Main cooling:	0.0 % of Design Capacity by adjusting airfl	Available (100%)	People	100%
Aux cooling:		Available (100%)	Lights	100%
Main heating:	100.0 % of Design Capacity	Available (100%)	Misc loads	100%
Aux heating:		Available (100%)		
Preheat:	100.0% of Design Capacity	Available (100%)		
Reheat:	100.0 % of Design Capacity	Available (100%)		
Humidification:	100.0 % of Design Capacity	Available (100%)		

Fans

	Type	Static Press.	90.1 SP Adj	Full Load Energy Rate	Schedule	Efficiency	Priority
Primary	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	90	
Secondary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)	85	
Return	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	90	
System Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	90	
Room Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	85	
Optional ventilation	None	0.0 in. wg	NA	0.00000 kW	Available (100%)	90	
Auxiliary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)	85	
Fan Cycling					Cycle with heating loads only 0.0 ft		

SYSTEM ENTERED VALUES

By HDR

UH-2 - Unit Heaters

Design Air Conditions

	Max	Min				
Cooling supply:			Supply duct temperature diff:	0.0 °F	Design humidity ratio diff:	
Leaving cooling coil:			Reheat Temperature diff:	0.0 °F	Min room relative humidity:	
Heating supply:						

Advanced Options

Cooling coil sizing method:	No Coil	Supply fan motor location:	Supply	Night purge schedule:	Off (0%)
Cooling coil location:	Room	Return fan motor location:	Omit	Optimum start schedule:	Off (0%)
Block cooling airflow:		Supply fan cofiguration:	Blow Thru	Optimum stop schedule:	Off (0%)
Ventilation deck location:	Return/Outdoor Deck	Supply fan sizing:	No Fan		
Supply duct location:	Return Air	Fan mechanical efficiency :	75%	CO2-based DCV:	None
Return air path:	ROOMDK	Apply Std62 People Avg:	No		
		Std62 Max Vent (Z) Ratio:		System ventilation flag:	Sum Room OA Reqs

Reset per worst case room schedule:	Off (0%)		Supply air path / duct location:	Return Air
Max reset:			Space convective gains to occupied layer:	100 %
Use system default outside air reset:	Yes		Underfloor plenum height:	
			Conductive resistance of raised floor:	0.8 hr·ft²·°F/Btu
			Upstream nominal leakage fraction:	0 %
			Downstream constant leakage fraction:	0 %
	Control Method	Control Type	Aux cooling coil losses to plenum:	0 %
Auxiliary cooling coil	Activate After Primary System	None		
Auxiliary heating coil	Activate After Primary System	None		
Auxiliary fan	No Fan			

Coils

	Capacity	Schedule	Diversity	
Main cooling:	0.0 % of Design Capacity by adjusting airfl	Available (100%)	People	100%
Aux cooling:		Available (100%)	Lights	100%
Main heating:	100.0 % of Design Capacity	Available (100%)	Misc loads	100%
Aux heating:		Available (100%)		
Preheat:	100.0% of Design Capacity	Available (100%)		
Reheat:	100.0 % of Design Capacity	Available (100%)		
Humidification:	100.0 % of Design Capacity	Available (100%)		

Fans

	Type	Static Press.	90.1 SP Adj	Full Load Energy Rate	Schedule	Efficiency	Priority
Primary	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	90	
Secondary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)	85	
Return	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	90	
System Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	90	
Room Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	85	
Optional ventilation	None	0.0 in. wg	NA	0.00000 kW	Available (100%)	90	
Auxiliary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)	85	
Fan Cycling					Cycle with heating loads only 0.0 ft		

SYSTEM ENTERED VALUES

By HDR

SS-2 - Incremental Heat Pump

Design Air Conditions

	Max	Min				
Cooling supply:			Supply duct temperature diff:	0.0 °F	Design humidity ratio diff:	
Leaving cooling coil:			Reheat Temperature diff:	0.0 °F	Min room relative humidity:	
Heating supply:						

Advanced Options

Cooling coil sizing method:	Peak	Supply fan motor location:	Supply	Night purge schedule:	Off (0%)
Cooling coil location:	Room	Return fan motor location:	Omit	Optimum start schedule:	Off (0%)
Block cooling airflow:		Supply fan cofiguration:	Blow Thru	Optimum stop schedule:	Off (0%)
Ventilation deck location:	Return/Outdoor Deck	Supply fan sizing:	Peak		
Supply duct location:	Return Air	Fan mechanical efficiency :	75%	CO2-based DCV:	None
Return air path:	ROOMDK	Apply Std62 People Avg:	No		
		Std62 Max Vent (Z) Ratio:		System ventilation flag:	Sum Room OA Reqs

Reset per worst case room schedule:	Off (0%)		Supply air path / duct location:	Return Air
Max reset:			Space convective gains to occupied layer:	100 %
Use system default outside air reset:	Yes		Underfloor plenum height:	
			Conductive resistance of raised floor:	0.8 hr·ft²·°F/Btu
			Upstream nominal leakage fraction:	0 %
			Downstream constant leakage fraction:	0 %
	Control Method	Control Type	Aux cooling coil losses to plenum:	0 %
Auxiliary cooling coil	Activate After Primary System	None		
Auxiliary heating coil	Activate After Primary System	None		
Auxiliary fan	No Fan			

Coils

	Capacity	Schedule	Diversity	
Main cooling:	100.0 % of Design Capacity by adjusting a	Available (100%)	People	100%
Aux cooling:		Available (100%)	Lights	100%
Main heating:	100.0 % of Design Capacity	Available (100%)	Misc loads	100%
Aux heating:		Available (100%)		
Preheat:	100.0% of Design Capacity	Available (100%)		
Reheat:	100.0 % of Design Capacity	Available (100%)		
Humidification:	100.0 % of Design Capacity	Available (100%)		

Fans

	Type	Static Press.	90.1 SP Adj	Full Load Energy Rate	Schedule		Efficiency	Priority
Primary	Fan coil supply fan	0.1 in. wg	0.0 in. wg	0.00024 kW/Cfm	Available (100%)		90	
Secondary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)		85	
Return	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)		90	
System Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)		90	
Room Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)		85	
Optional ventilation	None	0.0 in. wg	NA	0.00000 kW	Available (100%)		90	
Auxiliary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)		85	
Fan Cycling					Cycle with all loads	0.0 ft		

SYSTEM ENTERED VALUES

By HDR

AHU - OFFICE - Variable Volume Reheat (30% Min Flow Default)

Design Air Conditions

	Max	Min				
Cooling supply:			Supply duct temperature diff:	0.0 °F	Design humidity ratio diff:	
Leaving cooling coil:	58.0 °F	52.0 °F	Reheat Temperature diff:	0.0 °F	Min room relative humidity:	
Heating supply:	90.0 °F					

Advanced Options

Cooling coil sizing method:	Block	Supply fan motor location:	Supply	Night purge schedule:	Off (0%)
Cooling coil location:	System	Return fan motor location:	Omit	Optimum start schedule:	Available (100%)
Block cooling airflow:		Supply fan cofiguration:	Draw Thru	Optimum stop schedule:	Off (0%)
Ventilation deck location:	Return/Outdoor Deck	Supply fan sizing:	Block		
Supply duct location:	Return Air	Fan mechanical efficiency :	75%	CO2-based DCV:	None
Return air path:	DUCTED	Apply Std62 People Avg:	No		
		Std62 Max Vent (Z) Ratio:	60 %	System ventilation flag:	ASHRAE Std 62.1-2004-2010

Reset per worst case room schedule:	Off (0%)		Supply air path / duct location:	Return Air
Max reset:			Space convective gains to occupied layer:	100 %
Use system default outside air reset:	Yes		Underfloor plenum height:	
			Conductive resistance of raised floor:	0.8 hr·ft²·°F/Btu
			Upstream nominal leakage fraction:	0 %
			Downstream constant leakage fraction:	0 %
			Aux cooling coil losses to plenum:	0 %

	Control Method	Control Type
Auxiliary cooling coil	Activate After Primary System	None
Auxiliary heating coil	Activate After Primary System	None
Auxiliary fan	No Fan	

Coils

	Capacity	Schedule	Diversity	
Main cooling:	100.0 % of Design Capacity by adjusting a	Available (100%)	People	100%
Aux cooling:		Available (100%)	Lights	100%
Main heating:	100.0 % of Design Capacity	Available (100%)	Misc loads	100%
Aux heating:		Available (100%)		
Preheat:	100.0% of Design Capacity	Available (100%)		
Reheat:	100.0 % of Design Capacity	Available (100%)		
Humidification:	100.0 % of Design Capacity	Available (100%)		

Fans

	Type	Static Press.	90.1 SP Adj	Full Load Energy Rate	Schedule		Efficiency	Priority
Primary	AF Centrifugal var freq drv	4.0 in. wg	0.0 in. wg	0.00022 kW/Cfm-in wg	Available (100%)		90	
Secondary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)		85	
Return	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)		90	
System Exhaust	BI Centrifugal var spd mtr	0.2 in. wg	0.0 in. wg	0.00027 kW/Cfm-in wg	Available (100%)		90	
Room Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)		85	
Optional ventilation	None	0.0 in. wg	NA	0.00000 kW	Available (100%)		90	
Auxiliary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)		85	
Fan Cycling					Cycle with occupancy	0.0 ft		

SYSTEM ENTERED VALUES

By HDR

SS-1 - Incremental Heat Pump

Design Air Conditions

	Max	Min				
Cooling supply:			Supply duct temperature diff:	0.0 °F	Design humidity ratio diff:	
Leaving cooling coil:			Reheat Temperature diff:	0.0 °F	Min room relative humidity:	
Heating supply:						

Advanced Options

Cooling coil sizing method:	Peak	Supply fan motor location:	Supply	Night purge schedule:	Off (0%)
Cooling coil location:	Room	Return fan motor location:	Omit	Optimum start schedule:	Off (0%)
Block cooling airflow:		Supply fan cofiguration:	Blow Thru	Optimum stop schedule:	Off (0%)
Ventilation deck location:	Return/Outdoor Deck	Supply fan sizing:	Peak		
Supply duct location:	Return Air	Fan mechanical efficiency :	75%	CO2-based DCV:	None
Return air path:	ROOMDK	Apply Std62 People Avg:	No		
		Std62 Max Vent (Z) Ratio:		System ventilation flag:	Sum Room OA Reqs

Reset per worst case room schedule:	Off (0%)		Supply air path / duct location:	Return Air
Max reset:			Space convective gains to occupied layer:	100 %
Use system default outside air reset:	Yes		Underfloor plenum height:	
			Conductive resistance of raised floor:	0.8 hr·ft²·°F/Btu
			Upstream nominal leakage fraction:	0 %
			Downstream constant leakage fraction:	0 %
	Control Method	Control Type	Aux cooling coil losses to plenum:	0 %
Auxiliary cooling coil	Activate After Primary System	None		
Auxiliary heating coil	Activate After Primary System	None		
Auxiliary fan	No Fan			

Coils

	Capacity	Schedule	Diversity	
Main cooling:	100.0 % of Design Capacity by adjusting a	Available (100%)	People	100%
Aux cooling:		Available (100%)	Lights	100%
Main heating:	100.0 % of Design Capacity	Available (100%)	Misc loads	100%
Aux heating:		Available (100%)		
Preheat:	100.0% of Design Capacity	Available (100%)		
Reheat:	100.0 % of Design Capacity	Available (100%)		
Humidification:	100.0 % of Design Capacity	Available (100%)		

Fans

	Type	Static Press.	90.1 SP Adj	Full Load Energy Rate	Schedule		Efficiency	Priority
Primary	Fan coil supply fan	0.1 in. wg	0.0 in. wg	0.00024 kW/Cfm	Available (100%)		90	
Secondary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)		85	
Return	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)		90	
System Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)		90	
Room Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)		85	
Optional ventilation	None	0.0 in. wg	NA	0.00000 kW	Available (100%)		90	
Auxiliary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)		85	
Fan Cycling					Cycle with all loads	0.0 ft		

SYSTEM ENTERED VALUES

By HDR

UH-1 - Unit Heaters

Design Air Conditions

	Max	Min				
Cooling supply:			Supply duct temperature diff:	0.0 °F	Design humidity ratio diff:	
Leaving cooling coil:			Reheat Temperature diff:	0.0 °F	Min room relative humidity:	
Heating supply:						

Advanced Options

Cooling coil sizing method:	No Coil	Supply fan motor location:	Supply	Night purge schedule:	Off (0%)
Cooling coil location:	Room	Return fan motor location:	Omit	Optimum start schedule:	Off (0%)
Block cooling airflow:		Supply fan cofiguration:	Blow Thru	Optimum stop schedule:	Off (0%)
Ventilation deck location:	Return/Outdoor Deck	Supply fan sizing:	No Fan		
Supply duct location:	Return Air	Fan mechanical efficiency :	75%	CO2-based DCV:	None
Return air path:	ROOMDK	Apply Std62 People Avg:	No		
		Std62 Max Vent (Z) Ratio:		System ventilation flag:	Sum Room OA Reqs

Reset per worst case room schedule:	Off (0%)		Supply air path / duct location:	Return Air
Max reset:			Space convective gains to occupied layer:	100 %
Use system default outside air reset:	Yes		Underfloor plenum height:	
			Conductive resistance of raised floor:	0.8 hr·ft²·°F/Btu
			Upstream nominal leakage fraction:	0 %
			Downstream constant leakage fraction:	0 %
	Control Method	Control Type	Aux cooling coil losses to plenum:	0 %
Auxiliary cooling coil	Activate After Primary System	None		
Auxiliary heating coil	Activate After Primary System	None		
Auxiliary fan	No Fan			

Coils

	Capacity	Schedule	Diversity	
Main cooling:	0.0 % of Design Capacity by adjusting airfl	Available (100%)	People	100%
Aux cooling:		Available (100%)	Lights	100%
Main heating:	100.0 % of Design Capacity	Available (100%)	Misc loads	100%
Aux heating:		Available (100%)		
Preheat:	100.0% of Design Capacity	Available (100%)		
Reheat:	100.0 % of Design Capacity	Available (100%)		
Humidification:	100.0 % of Design Capacity	Available (100%)		

Fans

	Type	Static Press.	90.1 SP Adj	Full Load Energy Rate	Schedule	Efficiency	Priority
Primary	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	90	
Secondary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)	85	
Return	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	90	
System Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	90	
Room Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	85	
Optional ventilation	None	0.0 in. wg	NA	0.00000 kW	Available (100%)	90	
Auxiliary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)	85	
Fan Cycling					Cycle with heating loads only 0.0 ft		

SYSTEM ENTERED VALUES

By HDR

UH-2 - Unit Heaters

Design Air Conditions

	Max	Min				
Cooling supply:			Supply duct temperature diff:	0.0 °F	Design humidity ratio diff:	
Leaving cooling coil:			Reheat Temperature diff:	0.0 °F	Min room relative humidity:	
Heating supply:						

Advanced Options

Cooling coil sizing method:	No Coil	Supply fan motor location:	Supply	Night purge schedule:	Off (0%)
Cooling coil location:	Room	Return fan motor location:	Omit	Optimum start schedule:	Off (0%)
Block cooling airflow:		Supply fan cofiguration:	Blow Thru	Optimum stop schedule:	Off (0%)
Ventilation deck location:	Return/Outdoor Deck	Supply fan sizing:	No Fan		
Supply duct location:	Return Air	Fan mechanical efficiency :	75%	CO2-based DCV:	None
Return air path:	ROOMDK	Apply Std62 People Avg:	No		
		Std62 Max Vent (Z) Ratio:		System ventilation flag:	Sum Room OA Reqs

Reset per worst case room schedule:	Off (0%)			Supply air path / duct location:	Return Air
Max reset:				Space convective gains to occupied layer:	100 %
Use system default outside air reset:	Yes			Underfloor plenum height:	
				Conductive resistance of raised floor:	0.8 hr·ft²·°F/Btu
				Upstream nominal leakage fraction:	0 %
				Downstream constant leakage fraction:	0 %
	Control Method	Control Type		Aux cooling coil losses to plenum:	0 %
Auxiliary cooling coil	Activate After Primary System	None			
Auxiliary heating coil	Activate After Primary System	None			
Auxiliary fan	No Fan				

Coils

	Capacity	Schedule	Diversity	
Main cooling:	0.0 % of Design Capacity by adjusting airfl	Available (100%)	People	100%
Aux cooling:		Available (100%)	Lights	100%
Main heating:	100.0 % of Design Capacity	Available (100%)	Misc loads	100%
Aux heating:		Available (100%)		
Preheat:	100.0% of Design Capacity	Available (100%)		
Reheat:	100.0 % of Design Capacity	Available (100%)		
Humidification:	100.0 % of Design Capacity	Available (100%)		

Fans

	Type	Static Press.	90.1 SP Adj	Full Load Energy Rate	Schedule	Efficiency	Priority
Primary	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	90	
Secondary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)	85	
Return	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	90	
System Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	90	
Room Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	85	
Optional ventilation	None	0.0 in. wg	NA	0.00000 kW	Available (100%)	90	
Auxiliary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)	85	
Fan Cycling					Cycle with heating loads only 0.0 ft		

SYSTEM ENTERED VALUES

By HDR

SS-1 - Incremental Heat Pump

Design Air Conditions

	Max	Min				
Cooling supply:			Supply duct temperature diff:	0.0 °F	Design humidity ratio diff:	
Leaving cooling coil:			Reheat Temperature diff:	0.0 °F	Min room relative humidity:	
Heating supply:						

Advanced Options

Cooling coil sizing method:	Peak	Supply fan motor location:	Supply	Night purge schedule:	Off (0%)
Cooling coil location:	Room	Return fan motor location:	Omit	Optimum start schedule:	Off (0%)
Block cooling airflow:		Supply fan cofiguration:	Blow Thru	Optimum stop schedule:	Off (0%)
Ventilation deck location:	Return/Outdoor Deck	Supply fan sizing:	Peak		
Supply duct location:	Return Air	Fan mechanical efficiency :	75%	CO2-based DCV:	None
Return air path:	PLENUM	Apply Std62 People Avg:	No		
		Std62 Max Vent (Z) Ratio:		System ventilation flag:	Sum Room OA Reqs

Reset per worst case room schedule:	Off (0%)		Supply air path / duct location:	Return Air
Max reset:			Space convective gains to occupied layer:	100 %
Use system default outside air reset:	Yes		Underfloor plenum height:	
			Conductive resistance of raised floor:	0.8 hr·ft²·°F/Btu
			Upstream nominal leakage fraction:	0 %
			Downstream constant leakage fraction:	0 %
	Control Method	Control Type	Aux cooling coil losses to plenum:	0 %
Auxiliary cooling coil	Activate After Primary System	None		
Auxiliary heating coil	Activate After Primary System	None		
Auxiliary fan	No Fan			

Coils

	Capacity	Schedule	Diversity	
Main cooling:	100.0 % of Design Capacity by adjusting a	Available (100%)	People	100%
Aux cooling:		Available (100%)	Lights	100%
Main heating:	100.0 % of Design Capacity	Available (100%)	Misc loads	100%
Aux heating:		Available (100%)		
Preheat:	100.0% of Design Capacity	Available (100%)		
Reheat:	100.0 % of Design Capacity	Available (100%)		
Humidification:	100.0 % of Design Capacity	Available (100%)		

Fans

	Type	Static Press.	90.1 SP Adj	Full Load Energy Rate	Schedule		Efficiency	Priority
Primary	Fan coil supply fan	0.1 in. wg	0.0 in. wg	0.00024 kW/Cfm	Available (100%)		90	
Secondary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)		85	
Return	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)		90	
System Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)		90	
Room Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)		85	
Optional ventilation	None	0.0 in. wg	NA	0.00000 kW	Available (100%)		90	
Auxiliary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)		85	
Fan Cycling					Cycle with all loads	0.0 ft		

SYSTEM ENTERED VALUES

By HDR

SS-2 - Incremental Heat Pump

Design Air Conditions

	Max	Min				
Cooling supply:			Supply duct temperature diff:	0.0 °F	Design humidity ratio diff:	
Leaving cooling coil:			Reheat Temperature diff:	0.0 °F	Min room relative humidity:	
Heating supply:						

Advanced Options

Cooling coil sizing method:	Peak	Supply fan motor location:	Supply	Night purge schedule:	Off (0%)
Cooling coil location:	Room	Return fan motor location:	Omit	Optimum start schedule:	Off (0%)
Block cooling airflow:		Supply fan cofiguration:	Blow Thru	Optimum stop schedule:	Off (0%)
Ventilation deck location:	Return/Outdoor Deck	Supply fan sizing:	Peak		
Supply duct location:	Return Air	Fan mechanical efficiency :	75%	CO2-based DCV:	None
Return air path:	ROOMDK	Apply Std62 People Avg:	No		
		Std62 Max Vent (Z) Ratio:		System ventilation flag:	Sum Room OA Reqs

Reset per worst case room schedule:	Off (0%)		Supply air path / duct location:	Return Air
Max reset:			Space convective gains to occupied layer:	100 %
Use system default outside air reset:	Yes		Underfloor plenum height:	
			Conductive resistance of raised floor:	0.8 hr·ft²·°F/Btu
			Upstream nominal leakage fraction:	0 %
			Downstream constant leakage fraction:	0 %
			Aux cooling coil losses to plenum:	0 %

	Control Method	Control Type
Auxiliary cooling coil	Activate After Primary System	None
Auxiliary heating coil	Activate After Primary System	None
Auxiliary fan	No Fan	

Coils

	Capacity	Schedule	Diversity	
Main cooling:	100.0 % of Design Capacity by adjusting a	Available (100%)	People	100%
Aux cooling:		Available (100%)	Lights	100%
Main heating:	100.0 % of Design Capacity	Available (100%)	Misc loads	100%
Aux heating:		Available (100%)		
Preheat:	100.0% of Design Capacity	Available (100%)		
Reheat:	100.0 % of Design Capacity	Available (100%)		
Humidification:	100.0 % of Design Capacity	Available (100%)		

Fans

	Type	Static Press.	90.1 SP Adj	Full Load Energy Rate	Schedule		Efficiency	Priority
Primary	Fan coil supply fan	0.1 in. wg	0.0 in. wg	0.00024 kW/Cfm	Available (100%)		90	
Secondary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)		85	
Return	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)		90	
System Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)		90	
Room Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)		85	
Optional ventilation	None	0.0 in. wg	NA	0.00000 kW	Available (100%)		90	
Auxiliary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)		85	
Fan Cycling					Cycle with all loads	0.0 ft		

SYSTEM ENTERED VALUES

By HDR

RTU-1 - System 3 - 2007/2010 - Packaged Rooftop Air Conditioner

Design Air Conditions

	Max	Min				
Cooling supply:			Supply duct temperature diff:	0.0 °F	Design humidity ratio diff:	
Leaving cooling coil:			Reheat Temperature diff:	0.0 °F	Min room relative humidity:	
Heating supply:	90.0 °F					

Direct / Indirect Dehumidification

Type:	Direct dehumidification by controlling rel hum in worst case rm	Main cooling coil min Leaving Temp:		Airflow at low speed:	
Max room RH:	50%	Number of fan speeds:	None	Airflow at medium speed:	

Advanced Options

Cooling coil sizing method:	Peak	Supply fan motor location:	Supply	Night purge schedule:	Off (0%)
Cooling coil location:	System	Return fan motor location:	Omit	Optimum start schedule:	Available (100%)
Block cooling airflow:		Supply fan cofiguration:	Draw Thru	Optimum stop schedule:	Off (0%)
Ventilation deck location:	Return/Outdoor Deck	Supply fan sizing:	Peak		
Supply duct location:	Return Air	Fan mechanical efficiency :	75%	CO2-based DCV:	None
Return air path:	DUCTED	Apply Std62 People Avg:	No		
		Std62 Max Vent (Z) Ratio:	55 %	System ventilation flag:	ASHRAE Std 62.1-2004-2010

Reset per worst case room schedule:	Off (0%)		Supply air path / duct location:	Return Air
Max reset:			Space convective gains to occupied layer:	100 %
Use system default outside air reset:	Yes		Underfloor plenum height:	
			Conductive resistance of raised floor:	0.8 hr·ft²·°F/Btu
			Upstream nominal leakage fraction:	0 %
			Downstream constant leakage fraction:	0 %
			Aux cooling coil losses to plenum:	0 %

	Control Method	Control Type
Auxiliary cooling coil	Activate After Primary System	None
Auxiliary heating coil	Activate After Primary System	None
Auxiliary fan	No Fan	

Coils

	Capacity	Schedule	Diversity	
Main cooling:	115.0 % of Design Cooling Capacity	Available (100%)	People	100%
Aux cooling:		Available (100%)	Lights	100%
Main heating:	125.0 % of Design Capacity	Available (100%)	Misc loads	100%
Aux heating:		Available (100%)		
Preheat:	125.0% of Design Capacity	Available (100%)		
Reheat:	100.0 % of Design Capacity	Available (100%)		
Humidification:	100.0 % of Design Capacity	Available (100%)		

Fans

	Type	Static Press.	90.1 SP Adj	Full Load Energy Rate	Schedule		Efficiency	Priority
Primary	FC Centrifugal Const Vol	0.5 in. wg	0.0 in. wg	1.42600 kW	Available (100%)		90	
Secondary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)		85	
Return	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)		90	
System Exhaust	FC Centrifugal const vol	0.2 in. wg	0.0 in. wg	0.00032 kW/Cfm-in wg	Available (100%)		90	
Room Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)		85	
Optional ventilation	None	0.0 in. wg	NA	0.00000 kW	Available (100%)		90	
Auxiliary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)		85	
Fan Cycling					Cycle with occupancy	0.0 ft		

SYSTEM ENTERED VALUES

By HDR

RTU-2 - System 3 - 2007/2010 - Packaged Rooftop Air Conditioner

Design Air Conditions

	Max	Min				
Cooling supply:			Supply duct temperature diff:	0.0 °F	Design humidity ratio diff:	
Leaving cooling coil:			Reheat Temperature diff:	0.0 °F	Min room relative humidity:	
Heating supply:	90.0 °F					

Direct / Indirect Dehumidification

Type:	Direct dehumidification by controlling rel hum in worst case rm	Main cooling coil min Leaving Temp:		Airflow at low speed:	
Max room RH:	50%	Number of fan speeds:	None	Airflow at medium speed:	

Advanced Options

Cooling coil sizing method:	Peak	Supply fan motor location:	Supply	Night purge schedule:	Off (0%)
Cooling coil location:	System	Return fan motor location:	Omit	Optimum start schedule:	Available (100%)
Block cooling airflow:		Supply fan cofiguration:	Draw Thru	Optimum stop schedule:	Off (0%)
Ventilation deck location:	Return/Outdoor Deck	Supply fan sizing:	Peak		
Supply duct location:	Return Air	Fan mechanical efficiency :	75%	CO2-based DCV:	None
Return air path:	DUCTED	Apply Std62 People Avg:	No		
		Std62 Max Vent (Z) Ratio:	55 %	System ventilation flag:	ASHRAE Std 62.1-2004-2010

Reset per worst case room schedule:	Off (0%)		Supply air path / duct location:	Return Air
Max reset:			Space convective gains to occupied layer:	100 %
Use system default outside air reset:	Yes		Underfloor plenum height:	
			Conductive resistance of raised floor:	0.8 hr·ft²·°F/Btu
			Upstream nominal leakage fraction:	0 %
			Downstream constant leakage fraction:	0 %
			Aux cooling coil losses to plenum:	0 %

	Control Method	Control Type
Auxiliary cooling coil	Activate After Primary System	None
Auxiliary heating coil	Activate After Primary System	None
Auxiliary fan	No Fan	

Coils

	Capacity	Schedule	Diversity	
Main cooling:	115.0 % of Design Cooling Capacity	Available (100%)	People	100%
Aux cooling:		Available (100%)	Lights	100%
Main heating:	125.0 % of Design Capacity	Available (100%)	Misc loads	100%
Aux heating:		Available (100%)		
Preheat:	125.0% of Design Capacity	Available (100%)		
Reheat:	100.0 % of Design Capacity	Available (100%)		
Humidification:	100.0 % of Design Capacity	Available (100%)		

Fans

	Type	Static Press.	90.1 SP Adj	Full Load Energy Rate	Schedule		Efficiency	Priority
Primary	FC Centrifugal Const Vol	0.5 in. wg	0.0 in. wg	1.78500 kW	Available (100%)		90	
Secondary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)		85	
Return	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)		90	
System Exhaust	FC Centrifugal const vol	0.2 in. wg	0.0 in. wg	0.00032 kW/Cfm-in wg	Available (100%)		90	
Room Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)		85	
Optional ventilation	None	0.0 in. wg	NA	0.00000 kW	Available (100%)		90	
Auxiliary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)		85	
Fan Cycling					Cycle with occupancy	0.0 ft		

SYSTEM ENTERED VALUES

By HDR

UH-1 - Unit Heaters

Design Air Conditions

	Max	Min				
Cooling supply:			Supply duct temperature diff:	0.0 °F	Design humidity ratio diff:	
Leaving cooling coil:			Reheat Temperature diff:	0.0 °F	Min room relative humidity:	
Heating supply:						

Advanced Options

Cooling coil sizing method:	No Coil	Supply fan motor location:	Supply	Night purge schedule:	Off (0%)
Cooling coil location:	Room	Return fan motor location:	Omit	Optimum start schedule:	Off (0%)
Block cooling airflow:		Supply fan cofiguration:	Blow Thru	Optimum stop schedule:	Off (0%)
Ventilation deck location:	Return/Outdoor Deck	Supply fan sizing:	No Fan		
Supply duct location:	Return Air	Fan mechanical efficiency :	75%	CO2-based DCV:	None
Return air path:	ROOMDK	Apply Std62 People Avg:	No		
		Std62 Max Vent (Z) Ratio:		System ventilation flag:	Sum Room OA Reqs

Reset per worst case room schedule:	Off (0%)			Supply air path / duct location:	Return Air
Max reset:				Space convective gains to occupied layer:	100 %
Use system default outside air reset:	Yes			Underfloor plenum height:	
				Conductive resistance of raised floor:	0.8 hr·ft²·°F/Btu
				Upstream nominal leakage fraction:	0 %
				Downstream constant leakage fraction:	0 %
	Control Method	Control Type		Aux cooling coil losses to plenum:	0 %
Auxiliary cooling coil	Activate After Primary System	None			
Auxiliary heating coil	Activate After Primary System	None			
Auxiliary fan	No Fan				

Coils

	Capacity	Schedule	Diversity	
Main cooling:	0.0 % of Design Capacity by adjusting airfl	Available (100%)	People	100%
Aux cooling:		Available (100%)	Lights	100%
Main heating:	100.0 % of Design Capacity	Available (100%)	Misc loads	100%
Aux heating:		Available (100%)		
Preheat:	100.0% of Design Capacity	Available (100%)		
Reheat:	100.0 % of Design Capacity	Available (100%)		
Humidification:	100.0 % of Design Capacity	Available (100%)		

Fans

	Type	Static Press.	90.1 SP Adj	Full Load Energy Rate	Schedule	Efficiency	Priority
Primary	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	90	
Secondary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)	85	
Return	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	90	
System Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	90	
Room Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	85	
Optional ventilation	None	0.0 in. wg	NA	0.00000 kW	Available (100%)	90	
Auxiliary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)	85	
Fan Cycling					Cycle with heating loads only 0.0 ft		

SYSTEM ENTERED VALUES

By HDR

UH-2 - Unit Heaters

Design Air Conditions

	Max	Min				
Cooling supply:			Supply duct temperature diff:	0.0 °F	Design humidity ratio diff:	
Leaving cooling coil:			Reheat Temperature diff:	0.0 °F	Min room relative humidity:	
Heating supply:						

Advanced Options

Cooling coil sizing method:	No Coil	Supply fan motor location:	Supply	Night purge schedule:	Off (0%)
Cooling coil location:	Room	Return fan motor location:	Omit	Optimum start schedule:	Off (0%)
Block cooling airflow:		Supply fan cofiguration:	Blow Thru	Optimum stop schedule:	Off (0%)
Ventilation deck location:	Return/Outdoor Deck	Supply fan sizing:	No Fan		
Supply duct location:	Return Air	Fan mechanical efficiency :	75%	CO2-based DCV:	None
Return air path:	ROOMDK	Apply Std62 People Avg:	No		
		Std62 Max Vent (Z) Ratio:		System ventilation flag:	Sum Room OA Reqs

Reset per worst case room schedule:	Off (0%)		Supply air path / duct location:	Return Air
Max reset:			Space convective gains to occupied layer:	100 %
Use system default outside air reset:	Yes		Underfloor plenum height:	
			Conductive resistance of raised floor:	0.8 hr·ft²·°F/Btu
			Upstream nominal leakage fraction:	0 %
			Downstream constant leakage fraction:	0 %
	Control Method	Control Type	Aux cooling coil losses to plenum:	0 %
Auxiliary cooling coil	Activate After Primary System	None		
Auxiliary heating coil	Activate After Primary System	None		
Auxiliary fan	No Fan			

Coils

	Capacity	Schedule	Diversity	
Main cooling:	0.0 % of Design Capacity by adjusting airfl	Available (100%)	People	100%
Aux cooling:		Available (100%)	Lights	100%
Main heating:	100.0 % of Design Capacity	Available (100%)	Misc loads	100%
Aux heating:		Available (100%)		
Preheat:	100.0% of Design Capacity	Available (100%)		
Reheat:	100.0 % of Design Capacity	Available (100%)		
Humidification:	100.0 % of Design Capacity	Available (100%)		

Fans

	Type	Static Press.	90.1 SP Adj	Full Load Energy Rate	Schedule	Efficiency	Priority
Primary	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	90	
Secondary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)	85	
Return	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	90	
System Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	90	
Room Exhaust	None	0.0 in. wg	0.0 in. wg	0.00000 kW	Available (100%)	85	
Optional ventilation	None	0.0 in. wg	NA	0.00000 kW	Available (100%)	90	
Auxiliary	None	0.0 in. wg	NA	0.00000 kW	Available (100%)	85	
Fan Cycling					Cycle with heating loads only 0.0 ft		

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: ATTIC | **Zone Description: No Zone** | **System Description: HEAT PUMPS**

GENERAL INFORMATION

Floor Area:	4,710 ft²	Flr-Flr Height:	7.6 ft
Plenum Height:	0.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	NO		
Design Clg DB / Drift Point:	80.0 °F / 85.0 °F		
Design Htg DB / Drift Point:	50.0 °F / 45.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	None		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	None	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Unconditioned		

PEOPLE

People Type:	None
# of People:	0 sq ft/person
People Sensible:	250 Btu/h
People Latent :	250 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	1.0 workstation/person

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 80% load to space
Fixture Type:	RECFL-NV
% Load to RA:	20 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.000 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	None	None
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

ENTERED VALUES

ROOM BY ROOM

By HDR

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Glass Area ft²	Glass Shade Coef	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
NORTH	1,120 ft²	0	67	90.1-13 Min Roof Nonres	0.0270	0.45		0			Overhang - None	None					
EAST	945 ft²	90	69	90.1-13 Min Roof Nonres	0.0270	0.45		0			Overhang - None	None					
SOUTH	1,735 ft²	180	67	90.1-13 Min Roof Nonres	0.0270	0.45		0			Overhang - None	None					
WEST	945 ft²	270	69	90.1-13 Min Roof Nonres	0.0270	0.45		0			Overhang - None	None					
NORTH - LARGE	392 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											
EAST- SMALL	24 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
SOUTH	76 ft²	180	0	90.1-13 Min Wall Nonres	0.0890	0.90											
EAST - LARGE	239 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WEST - LARGE	372 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WEST - SMALL	24 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											
NORTH - SMALL	25 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											
Floor - 1	860 ft²			2* Wood Floor	0.2666								Adjacent Room: 101 LOBBY				
Floor - 2	70 ft²			2* Wood Floor	0.2666								Adjacent Room: 102 WOMENS RR				
Floor - 3	65 ft²			2* Wood Floor	0.2666								Adjacent Room: 103 MENS RR				
Floor - 4	68 ft²			2* Wood Floor	0.2666								Adjacent Room: 104 WOMENS RR				
Floor - 5	62 ft²			2* Wood Floor	0.2666								Adjacent Room: 105 MENS RR				
Floor - 6	415 ft²			2* Wood Floor	0.2666								Adjacent Room: 106 VCC OFFICE				
Floor - 7	65 ft²			2* Wood Floor	0.2666								Adjacent Room: 107 JANITORS				
Floor - 8	85 ft²			2* Wood Floor	0.2666								Adjacent Room: 108 STORAGE				
Floor - 9	120 ft²			2* Wood Floor	0.2666								Adjacent Room: 109 VESTIBULE				
Floor - 10	230 ft²			2* Wood Floor	0.2666								Adjacent Room: 110 MMT CARRIER				
Floor - 11	160 ft²			2* Wood Floor	0.2666								Adjacent Room: 111 TRAF CHECK IN				
Floor - 12	740 ft²			2* Wood Floor	0.2666								Adjacent Room: 112 OPEN OFFICE				
Floor - 13	350 ft²			2* Wood Floor	0.2666								Adjacent Room: 113 CONFERENCE/				
Floor - 14	250 ft²			2* Wood Floor	0.2666								Adjacent Room: 114 BREAKROOM				
Floor - 15	173 ft²			2* Wood Floor	0.2666								Adjacent Room: 116 SR TRAFFIC OF				
Floor - 16	195 ft²			2* Wood Floor	0.2666								Adjacent Room: 117 SR TRAFFIC OF				
Floor - 17	90 ft²			2* Wood Floor	0.2666								Adjacent Room: 118 FILE ROOM				
Floor - 18	110 ft²			2* Wood Floor	0.2666								Adjacent Room: 119 COMM				
Floor - 19	615 ft²			2* Wood Floor	0.2666								Adjacent Room: HALLWAY				

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 101 LOBBY | **Zone Description: Zone - 001A** | **System Description: HEAT PUMPS**

GENERAL INFORMATION

Floor Area:	860 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	12 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	240.00 cfm	240.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Average Const.	Pressurized, Average Const.
Infil Value:	0.30 air changes/hr	0.30 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
NORTH	174 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WINDOW				Window			90.1-2013 Window	12	0.46	0.42	Overhang - None	None	0.00				
WEST	288 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WINDOW				Window			90.1-2013 Window	24	0.46	0.42	Overhang - None	None	0.00				
Misc Load 1	500.0 W			Misc - Low rise office			Electricity							100	100	0	60.00

Room Description: 102 WOMENS RR | **Zone Description: Zone - 001A** | **System Description: HEAT PUMPS**

GENERAL INFORMATION

Floor Area:	70 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	NO		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	None	None
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
NORTH	102 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 103 MENS RR | **Zone Description: Zone - 001A** | **System Description: HEAT PUMPS**

GENERAL INFORMATION

Floor Area: 65 ft² | Flr-Flr Height: 12.0 ft
Plenum Height: 3.0 ft | Height Above Flr:
Slab Cnstr Type: 4* LW Concrete
Room Mass: Time delay based on actual mass
Ceiling R-Value: 1.786 hr·ft²·°F/Btu
Is There Carpet?: NO
Design Clg DB / Drift Point: 74.0 °F / 78.0 °F
Design Htg DB / Drift Point: 68.0 °F / 64.0 °F
Design Relative Humidity: 50 %
Moisture Capacitance: Medium
Clg Tstat: None
Htg Tstat: None

Thermostat Location: Room | Floor Multiplier: 1
Humidistat Location: Room | Room Multiplier: 1
CO2 Sensor Location: None
Room Type: Conditioned

PEOPLE

People Type: General Office Space
# of People: 0 People
People Sensible: 250 Btu/h
People Latent : 200 Btu/h
People Schedule: People - Low Rise Office

Workstation: 0.0 workstations

LIGHTS

Lighting Type: Recessed fluorescent, not vented, 50% load to space
Fixture Type: RECFL-NV
% Load to RA: 50 %
Lighting Schedule: Lights - Low rise office
Lighting Amount: 0.800 W/sq ft
Ballast Factor: 1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	None	None
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef

Room Description: 104 WOMENS RR | **Zone Description: Zone - 001A** | **System Description: HEAT PUMPS**

GENERAL INFORMATION

Floor Area: 68 ft² | Flr-Flr Height: 12.0 ft
Plenum Height: 3.0 ft | Height Above Flr:
Slab Cnstr Type: 4* LW Concrete
Room Mass: Time delay based on actual mass
Ceiling R-Value: 1.786 hr·ft²·°F/Btu
Is There Carpet?: NO
Design Clg DB / Drift Point: 74.0 °F / 78.0 °F
Design Htg DB / Drift Point: 68.0 °F / 64.0 °F
Design Relative Humidity: 50 %
Moisture Capacitance: Medium
Clg Tstat: None
Htg Tstat: None

Thermostat Location: Room | Floor Multiplier: 1
Humidistat Location: Room | Room Multiplier: 1
CO2 Sensor Location: None
Room Type: Conditioned

PEOPLE

People Type: General Office Space
# of People: 0 People
People Sensible: 250 Btu/h
People Latent : 200 Btu/h
People Schedule: People - Low Rise Office

Workstation: 0.0 workstations

LIGHTS

Lighting Type: Recessed fluorescent, not vented, 50% load to space
Fixture Type: RECFL-NV
% Load to RA: 50 %
Lighting Schedule: Lights - Low rise office
Lighting Amount: 0.800 W/sq ft
Ballast Factor: 1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	None	None
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
NORTH	104 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 105 MENS RR | **Zone Description: Zone - 001A** | **System Description: HEAT PUMPS**

GENERAL INFORMATION

Floor Area:	62 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	NO		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	None	None
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef

Room Description: 107 JANITORS | **Zone Description: Zone - 002A** | **System Description: HEAT PUMPS**

GENERAL INFORMATION

Floor Area:	65 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	NO		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	None	None
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 108 STORAGE **Zone Description: Zone - 002A** **System Description: HEAT PUMPS**

GENERAL INFORMATION

Floor Area:	85 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	78.0 °F / 80.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	50.00 cfm	50.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: HALLWAY **Zone Description: Zone - 002A** **System Description: HEAT PUMPS**

GENERAL INFORMATION

Floor Area: 615 ft² Flr-Flr Height: 12.0 ft
Plenum Height: 3.0 ft Height Above Flr:
Slab Cnstr Type: 4* LW Concrete
Room Mass: Time delay based on actual mass
Ceiling R-Value: 1.786 hr·ft²·°F/Btu
Is There Carpet?: YES
Design Clg DB / Drift Point: 74.0 °F / 78.0 °F
Design Htg DB / Drift Point: 68.0 °F / 64.0 °F
Design Relative Humidity: 50 %
Moisture Capacitance: Medium
Clg Tstat: None
Htg Tstat: None

Thermostat Location: Room Floor Multiplier: 1
Humidistat Location: Room Room Multiplier: 1
CO2 Sensor Location: None
Room Type: Conditioned

PEOPLE

People Type: General Office Space
# of People: 0 People
People Sensible: 250 Btu/h
People Latent : 200 Btu/h
People Schedule: People - Low Rise Office

Workstation: 0.0 workstations

LIGHTS

Lighting Type: Recessed fluorescent, not vented, 50% load to space
Fixture Type: RECFL-NV
% Load to RA: 50 %
Lighting Schedule: Lights - Low rise office
Lighting Amount: 0.800 W/sq ft
Ballast Factor: 1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	50.00 cfm	50.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Average Const.	Pressurized, Average Const.
Infil Value:	0.30 air changes/hr	0.30 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Glass Area ft²	Glass Shade Coef	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
NORTH	138 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											
DOOR WINDOW				Window			90.1-2013 Window	10	0.46	0.42	Overhang - None	None	0.00				
DOOR				Door			90.1-13 Min Swinging	16	0.00	0.37	Overhang - None	None	0.00				
EAST	284 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
SOUTH	72 ft²	180	0	90.1-13 Min Wall Nonres	0.0890	0.90											
DOOR				Door			90.1-13 Min Swinging	16	0.00	0.37	Overhang - None	None	0.00				
DOOR WINDOW				Window			90.1-2013 Window	10	0.46	0.42	Overhang - None	None	0.00				

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 106 VCC OFFICE | **Zone Description: Zone - 002B** | **System Description: HEAT PUMPS**

GENERAL INFORMATION

Floor Area:	415 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	2 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	1.0 workstation/person

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	50.00 cfm	50.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
Misc	200.0 W			Misc - Low rise office			Electricity							100	100	0	60.00
Misc Load 2	150.0 Watts/worksta			Misc - Low rise office			Electricity							100	100	0	60.00

Room Description: 114 BREAKROOM | **Zone Description: Zone - 002C** | **System Description: HEAT PUMPS**

GENERAL INFORMATION

Floor Area:	250 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	NO		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	143 sq ft/person
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	50.00 cfm	50.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
Misc Load 1	500.0 W			Misc - Low rise office			Electricity							100	100	0	60.00

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 113 CONFERENCE/TRAINING | **Zone Description: Zone - 003A** | **System Description: HEAT PUMPS**

GENERAL INFORMATION

Floor Area:	350 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	14 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	280.00 cfm	280.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
Misc Load 1	320.0 W			Misc - Low rise office			Electricity							100	100	0	60.00

Room Description: 110 MMT CARRIER | **Zone Description: Zone - 004A** | **System Description: HEAT PUMPS**

GENERAL INFORMATION

Floor Area:	230 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	2 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	1.0 workstation/person

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	50.00 cfm	50.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
WEST	220 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											
Misc Load 1	150.0 Watts/worksta			Misc - Low rise office			Electricity							100	100	0	60.00

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 111 TRAF CHECK IN **Zone Description: Zone - 004B** **System Description: HEAT PUMPS**

GENERAL INFORMATION

Floor Area:	160 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	1 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	1.0 workstation/person

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	50.00 cfm	50.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
Misc Load 1	150.0 Watts/worksta			Misc - Low rise office			Electricity							100	100	0	60.00

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 112 OPEN OFFICE **Zone Description: Zone - 004B** **System Description: HEAT PUMPS**

GENERAL INFORMATION

Floor Area:	740 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	6 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	1.0 workstation/person

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	120.00 cfm	120.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
WEST	210 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											
SOUTH	483 ft²	180	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WINDOW				Window			90.1-2013 Window	36	0.46	0.42	Overhang - None	None	0.00				
EAST	60 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
Misc Load 2	150.0 Watts/worksta			Misc - Low rise office			Electricity							100	100	0	60.00
Copier	400.0 W			Misc - Low rise office			Electricity							100	100	0	60.00

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 116 SR TRAFFIC OFFICE **Zone Description: Zone - 005A** **System Description: HEAT PUMPS**

GENERAL INFORMATION

Floor Area: 173 ft² Flr-Flr Height: 12.0 ft
Plenum Height: 3.0 ft Height Above Flr:
Slab Cnstr Type: 4* LW Concrete
Room Mass: Time delay based on actual mass
Ceiling R-Value: 1.786 hr·ft²·°F/Btu
Is There Carpet?: YES
Design Clg DB / Drift Point: 74.0 °F / 78.0 °F
Design Htg DB / Drift Point: 68.0 °F / 64.0 °F
Design Relative Humidity: 50 %
Moisture Capacitance: Medium
Clg Tstat: None
Htg Tstat: None

Thermostat Location: Room Floor Multiplier: 1
Humidistat Location: Room Room Multiplier: 1
CO2 Sensor Location: None
Room Type: Conditioned

PEOPLE

People Type: General Office Space
# of People: 1 People
People Sensible: 250 Btu/h
People Latent : 200 Btu/h
People Schedule: People - Low Rise Office

Workstation: 1.0 workstation/person

LIGHTS

Lighting Type: Recessed fluorescent, not vented, 50% load to space
Fixture Type: RECFL-NV
% Load to RA: 50 %
Lighting Schedule: Lights - Low rise office
Lighting Amount: 0.800 W/sq ft
Ballast Factor: 1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	50.00 cfm	50.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Glass Area ft²	Glass Shade Coef	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
WEST	60 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											
SOUTH	171 ft²	180	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WINDOW				Window			90.1-2013 Window	12	0.46	0.42	Overhang - None	None	0.00				
Misc Load 1	150.0 Watts/worksta			Misc - Low rise office			Electricity							100	100	0	60.00

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 117 SR TRAFFIC OFFICE | **Zone Description: Zone - 005A** | **System Description: HEAT PUMPS**

GENERAL INFORMATION

Floor Area:	195 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	1 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	1.0 workstation/person

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	50.00 cfm	50.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
SOUTH	186 ft²	180	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WINDOW				Window			90.1-2013 Window	12	0.46	0.42	Overhang - None	None	0.00				
EAST	150 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WINDOW				Window			90.1-2013 Window	12	0.46	0.42	Overhang - None	None	0.00				
Misc Load 1	150.0 Watts/worksta			Misc - Low rise office			Electricity							100	100	0	60.00

Room Description: 118 FILE ROOM | **Zone Description: Zone - 005A** | **System Description: HEAT PUMPS**

GENERAL INFORMATION

Floor Area:	90 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	78.0 °F / 80.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	50.00 cfm	50.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
EAST	104 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 120 MECH/ELEC ROOM | **Zone Description: Zone - 006A** | **System Description: SS-1**

GENERAL INFORMATION

Floor Area:	180 ft²	Flr-Flr Height:	17.8 ft
Plenum Height:	0.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	80.0 °F / 85.0 °F		
Design Htg DB / Drift Point:	55.0 °F / 50.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	LED Lighting 100% load to space
Fixture Type:	LED Lighting
% Load to RA:	0 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Neutral, Tight Const.	Neutral, Tight Const.
Infil Value:	0.30 air changes/hr	0.30 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Glass Area ft²	Glass Shade Coef	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
Roof - 1	180 ft²	0	67	90.1-13 Min Roof Nonres	0.0270	0.45		0			Overhang - None	None					
EAST	204 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
DOOR				Door			90.1-13 Min Swinging	21	0.00	0.37	Overhang - None	None	0.00				
NORTH	114 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											

Room Description: 119 COMM | **Zone Description: Zone - 007A** | **System Description: SS-2**

GENERAL INFORMATION

Floor Area:	110 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	NO		
Design Clg DB / Drift Point:	74.0 °F / 74.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 68.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Glass Area ft²	Glass Shade Coef	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
EAST	126 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
Misc Load 1	0.50 tons			Misc - Surgery hospital			Electricity							100	100	0	60.00

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 100 VESTIBULE **Zone Description: No Zone** **System Description: UH-1**

GENERAL INFORMATION

Floor Area:	92 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	NO		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Average Const.	Pressurized, Average Const.
Infil Value:	0.30 air changes/hr	0.30 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Glass Area ft²	Glass Shade Coef	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
Roof - 1	92 ft²	0	90	90.1-13 Min Roof Nonres	0.0270	0.45		0			Overhang - None	None					
NORTH	144 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											
DOOR				Door			90.1-13 Min Swinging	26	0.00	0.37	Overhang - None	None	0.00				
DOOR WINDOW				Window			90.1-2013 Window	20	0.46	0.42	Overhang - None	None	0.00				
EAST	92 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WEST	92 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 109 VESTIBULE **Zone Description: No Zone** **System Description: UH-2**

GENERAL INFORMATION

Floor Area:	120 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Average Const.	Pressurized, Average Const.
Infil Value:	0.30 air changes/hr	0.30 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
NORTH	114 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WEST	156 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											
DOOR WINDOW				Window			90.1-2013 Window	20	0.46	0.42	Overhang - None	None	0.00				
DOOR				Door			90.1-13 Min Swinging	26	0.00	0.37	Overhang - None	None	0.00				

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 100 VESTIBULE **Zone Description: No Zone** **System Description: UH-1**

GENERAL INFORMATION

Floor Area:	92 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	NO		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Average Const.	Pressurized, Average Const.
Infil Value:	0.30 air changes/hr	0.30 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Glass Area ft²	Glass Shade Coef	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
Roof - 1	92 ft²	0	90	90.1-13 Min Roof Nonres	0.0270	0.45		0			Overhang - None	None					
NORTH	144 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											
DOOR				Door			90.1-13 Min Swinging	26	0.00	0.37	Overhang - None	None	0.00				
DOOR WINDOW				Window			90.1-2013 Window	20	0.28	0.42	Overhang - None	None	0.00				
EAST	92 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WEST	92 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 109 VESTIBULE **Zone Description: No Zone** **System Description: UH-2**

GENERAL INFORMATION

Floor Area:	120 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Average Const.	Pressurized, Average Const.
Infil Value:	0.30 air changes/hr	0.30 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
NORTH	114 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WEST	156 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											
DOOR WINDOW				Window			90.1-2013 Window	20	0.28	0.42	Overhang - None	None	0.00				
DOOR				Door			90.1-13 Min Swinging	26	0.00	0.37	Overhang - None	None	0.00				

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: ATTIC **Zone Description: No Zone** **System Description: VRF**

GENERAL INFORMATION

Floor Area:	4,710 ft²	Flr-Flr Height:	7.6 ft
Plenum Height:	0.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	NO		
Design Clg DB / Drift Point:	80.0 °F / 85.0 °F		
Design Htg DB / Drift Point:	50.0 °F / 45.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	None		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	None	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Unconditioned		

PEOPLE

People Type:	None
# of People:	0 sq ft/person
People Sensible:	250 Btu/h
People Latent :	250 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	1.0 workstation/person

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 80% load to space
Fixture Type:	RECFL-NV
% Load to RA:	20 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.000 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	None	None
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

ENTERED VALUES

ROOM BY ROOM

By HDR

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Glass Area ft²	Glass Shade Coef	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
NORTH	1,120 ft²	0	67	90.1-13 Min Roof Nonres	0.0270	0.45		0			Overhang - None	None					
EAST	945 ft²	90	69	90.1-13 Min Roof Nonres	0.0270	0.45		0			Overhang - None	None					
SOUTH	1,735 ft²	180	67	90.1-13 Min Roof Nonres	0.0270	0.45		0			Overhang - None	None					
WEST	945 ft²	270	69	90.1-13 Min Roof Nonres	0.0270	0.45		0			Overhang - None	None					
NORTH - LARGE	392 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											
EAST- SMALL	24 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
SOUTH	76 ft²	180	0	90.1-13 Min Wall Nonres	0.0890	0.90											
EAST - LARGE	239 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WEST - LARGE	372 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WEST - SMALL	24 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											
NORTH - SMALL	25 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											
Floor - 1	860 ft²			2* Wood Floor	0.2666								Adjacent Room: 101 LOBBY				
Floor - 2	70 ft²			2* Wood Floor	0.2666								Adjacent Room: 102 WOMENS RR				
Floor - 3	65 ft²			2* Wood Floor	0.2666								Adjacent Room: 103 MENS RR				
Floor - 4	68 ft²			2* Wood Floor	0.2666								Adjacent Room: 104 WOMENS RR				
Floor - 5	62 ft²			2* Wood Floor	0.2666								Adjacent Room: 105 MENS RR				
Floor - 6	415 ft²			2* Wood Floor	0.2666								Adjacent Room: 106 VCC OFFICE				
Floor - 7	65 ft²			2* Wood Floor	0.2666								Adjacent Room: 107 JANITORS				
Floor - 8	85 ft²			2* Wood Floor	0.2666								Adjacent Room: 108 STORAGE				
Floor - 9	120 ft²			2* Wood Floor	0.2666								Adjacent Room: 109 VESTIBULE				
Floor - 10	230 ft²			2* Wood Floor	0.2666								Adjacent Room: 110 MMT CARRIER				
Floor - 11	160 ft²			2* Wood Floor	0.2666								Adjacent Room: 111 TRAF CHECK IN				
Floor - 12	740 ft²			2* Wood Floor	0.2666								Adjacent Room: 112 OPEN OFFICE				
Floor - 13	350 ft²			2* Wood Floor	0.2666								Adjacent Room: 113 CONFERENCE/				
Floor - 14	250 ft²			2* Wood Floor	0.2666								Adjacent Room: 114 BREAKROOM				
Floor - 15	173 ft²			90.1-13 Min Floor Nonres	0.0382								Adjacent Room: 116 SR TRAFFIC OF				
Floor - 16	195 ft²			2* Wood Floor	0.2666								Adjacent Room: 117 SR TRAFFIC OF				
Floor - 17	90 ft²			2* Wood Floor	0.2666								Adjacent Room: 118 FILE ROOM				
Floor - 18	110 ft²			2* Wood Floor	0.2666								Adjacent Room: 119 COMM				
Floor - 19	615 ft²			2* Wood Floor	0.2666								Adjacent Room: HALLWAY				

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 101 LOBBY | **Zone Description: Zone - 001A** | **System Description: VRF**

GENERAL INFORMATION

Floor Area:	860 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	12 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	240.00 cfm	240.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Average Const.	Pressurized, Average Const.
Infil Value:	0.30 air changes/hr	0.30 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
NORTH	174 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WINDOW				Window			90.1-2013 Window	12	0.28	0.42	Overhang - None	None	0.00				
WEST	288 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WINDOW				Window			90.1-2013 Window	24	0.28	0.42	Overhang - None	None	0.00				
Misc Load 1	500.0 W			Misc - Low rise office			Electricity							100	100	0	60.00

Room Description: 102 WOMENS RR | **Zone Description: Zone - 001A** | **System Description: VRF**

GENERAL INFORMATION

Floor Area:	70 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	NO		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	None	None
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
NORTH	102 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 103 MENS RR | **Zone Description: Zone - 001A** | **System Description: VRF**

GENERAL INFORMATION

Floor Area:	65 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	NO		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	None	None
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef

Room Description: 104 WOMENS RR | **Zone Description: Zone - 001A** | **System Description: VRF**

GENERAL INFORMATION

Floor Area:	68 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	NO		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	None	None
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
NORTH	104 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 105 MENS RR | **Zone Description: Zone - 001A** | **System Description: VRF**

GENERAL INFORMATION

Floor Area:	62 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	NO		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	None	None
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef

Room Description: 107 JANITORS | **Zone Description: Zone - 002A** | **System Description: VRF**

GENERAL INFORMATION

Floor Area:	65 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	NO		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	None	None
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 108 STORAGE **Zone Description: Zone - 002A** **System Description: VRF**

GENERAL INFORMATION

Floor Area:	85 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	78.0 °F / 80.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	50.00 cfm	50.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: HALLWAY **Zone Description: Zone - 002A** **System Description: VRF**

GENERAL INFORMATION

Floor Area:	615 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	50.00 cfm	50.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Average Const.	Pressurized, Average Const.
Infil Value:	0.30 air changes/hr	0.30 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Glass Area ft²	Glass Shade Coef	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
NORTH	138 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											
DOOR WINDOW				Window			90.1-2013 Window	10	0.28	0.42	Overhang - None	None	0.00				
DOOR				Door			90.1-13 Min Swinging	16	0.00	0.37	Overhang - None	None	0.00				
EAST	284 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
SOUTH	72 ft²	180	0	90.1-13 Min Wall Nonres	0.0890	0.90											
DOOR				Door			90.1-13 Min Swinging	16	0.00	0.37	Overhang - None	None	0.00				
DOOR WINDOW				Window			90.1-2013 Window	10	0.28	0.42	Overhang - None	None	0.00				

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 106 VCC OFFICE | **Zone Description: Zone - 002B** | **System Description: VRF**

GENERAL INFORMATION

Floor Area:	415 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	2 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	1.0 workstation/person

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	50.00 cfm	50.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
Misc Load 1	200.0 W			Misc - Low rise office			Electricity							100	100	0	60.00
Misc Load 2	150.0 Watts/worksta			Misc - Low rise office			Electricity							100	100	0	60.00

Room Description: 114 BREAKROOM | **Zone Description: Zone - 002C** | **System Description: VRF**

GENERAL INFORMATION

Floor Area:	250 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	NO		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	143 sq ft/person
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	50.00 cfm	50.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
Misc Load 1	500.0 W			Misc - Low rise office			Electricity							100	100	0	60.00

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 113 CONFERENCE/TRAINING | **Zone Description: Zone - 003A** | **System Description: VRF**

GENERAL INFORMATION

Floor Area:	350 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	14 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	280.00 cfm	280.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
Misc Load 1	320.0 W			Misc - Low rise office			Electricity							100	100	0	60.00

Room Description: 110 MMT CARRIER | **Zone Description: Zone - 004A** | **System Description: VRF**

GENERAL INFORMATION

Floor Area:	230 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	2 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	1.0 workstation/person

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	50.00 cfm	50.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
WEST	220 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											
Misc Load 1	150.0 Watts/worksta			Misc - Low rise office			Electricity							100	100	0	60.00

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 111 TRAF CHECK IN **Zone Description: Zone - 004B** **System Description: VRF**

GENERAL INFORMATION

Floor Area:	160 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	1 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	1.0 workstation/person

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	50.00 cfm	50.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
Misc Load 1	150.0 Watts/worksta			Misc - Low rise office			Electricity							100	100	0	60.00

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 112 OPEN OFFICE **Zone Description: Zone - 004B** **System Description: VRF**

GENERAL INFORMATION

Floor Area:	740 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	6 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	1.0 workstation/person

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	120.00 cfm	120.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Glass Area ft²	Glass Shade Coef	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
WEST	210 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											
SOUTH	483 ft²	180	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WINDOW				Window			90.1-2013 Window	36	0.28	0.42	Overhang - None	None	0.00				
EAST	60 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
Copier	400.0 W			Misc - Low rise office			Electricity							100	100	0	60.00
Misc Load 2	150.0 Watts/worksta			Misc - Low rise office			Electricity							100	100	0	60.00

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 116 SR TRAFFIC OFFICE **Zone Description: Zone - 005A** **System Description: VRF**

GENERAL INFORMATION

Floor Area:	173 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	1 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	1.0 workstation/person

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	50.00 cfm	50.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Glass Area ft²	Glass Shade Coef	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
WEST	60 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											
SOUTH	171 ft²	180	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WINDOW				Window			90.1-2013 Window	12	0.28	0.42	Overhang - None	None	0.00				
Misc Load 1	150.0 Watts/worksta			Misc - Low rise office			Electricity							100	100	0	60.00

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 117 SR TRAFFIC OFFICE | **Zone Description: Zone - 005A** | **System Description: VRF**

GENERAL INFORMATION

Floor Area:	195 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	1 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	1.0 workstation/person

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	50.00 cfm	50.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
SOUTH	186 ft²	180	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WINDOW				Window			90.1-2013 Window	12	0.28	0.42	Overhang - None	None	0.00				
EAST	150 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WINDOW				Window			90.1-2013 Window	12	0.28	0.42	Overhang - None	None	0.00				
Misc Load 1	150.0 Watts/worksta			Misc - Low rise office			Electricity							100	100	0	60.00

Room Description: 118 FILE ROOM | **Zone Description: Zone - 005A** | **System Description: VRF**

GENERAL INFORMATION

Floor Area:	90 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	78.0 °F / 80.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	50.00 cfm	50.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
EAST	104 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 120 MECH/ELEC ROOM | **Zone Description: Zone - 006A** | **System Description: VRF**

GENERAL INFORMATION

Floor Area:	180 ft²	Flr-Flr Height:	17.8 ft
Plenum Height:	0.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	80.0 °F / 85.0 °F		
Design Htg DB / Drift Point:	55.0 °F / 50.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	LED Lighting 100% load to space
Fixture Type:	LED Lighting
% Load to RA:	0 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Neutral, Tight Const.	Neutral, Tight Const.
Infil Value:	0.30 air changes/hr	0.30 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Glass Area ft²	Glass Shade Coef	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
Roof - 1	180 ft²	0	67	90.1-13 Min Roof Nonres	0.0270	0.45		0			Overhang - None	None					
EAST	204 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
DOOR				Door			90.1-13 Min Swinging	21	0.00	0.37	Overhang - None	None	0.00				
NORTH	114 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											

Room Description: 119 COMM | **Zone Description: Zone - 007A** | **System Description: VRF**

GENERAL INFORMATION

Floor Area:	110 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	NO		
Design Clg DB / Drift Point:	74.0 °F / 74.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 68.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Glass Area ft²	Glass Shade Coef	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
EAST	126 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
Misc Load 1	0.50 tons			Misc - Surgery hospital			Electricity							100	100	0	60.00

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: ATTIC | **Zone Description: No Zone** | **System Description: AHU - OFFICE**

GENERAL INFORMATION

Floor Area:	4,710 ft²	Flr-Flr Height:	7.6 ft
Plenum Height:	0.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	NO		
Design Clg DB / Drift Point:	80.0 °F / 85.0 °F		
Design Htg DB / Drift Point:	50.0 °F / 45.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	None		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	None	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Unconditioned		

PEOPLE

People Type:	None
# of People:	0 sq ft/person
People Sensible:	250 Btu/h
People Latent :	250 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	1.0 workstation/person

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 80% load to space
Fixture Type:	RECFL-NV
% Load to RA:	20 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.000 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	None	None
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

ENTERED VALUES

ROOM BY ROOM

By HDR

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Glass Area ft²	Glass Shade Coef	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
NORTH	1,120 ft²	0	67	90.1-13 Min Roof Nonres	0.0270	0.45		0			Overhang - None	None					
EAST	945 ft²	90	69	90.1-13 Min Roof Nonres	0.0270	0.45		0			Overhang - None	None					
SOUTH	1,735 ft²	180	67	90.1-13 Min Roof Nonres	0.0270	0.45		0			Overhang - None	None					
WEST	945 ft²	270	69	90.1-13 Min Roof Nonres	0.0270	0.45		0			Overhang - None	None					
NORTH - LARGE	392 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											
EAST- SMALL	24 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
SOUTH	76 ft²	180	0	90.1-13 Min Wall Nonres	0.0890	0.90											
EAST - LARGE	239 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WEST - LARGE	372 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WEST - SMALL	24 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											
NORTH - SMALL	25 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											
Floor - 1	860 ft²			2* Wood Floor	0.2666								Adjacent Room: 101 LOBBY				
Floor - 2	70 ft²			2* Wood Floor	0.2666								Adjacent Room: 102 WOMENS RR				
Floor - 3	65 ft²			2* Wood Floor	0.2666								Adjacent Room: 103 MENS RR				
Floor - 4	68 ft²			2* Wood Floor	0.2666								Adjacent Room: 104 WOMENS RR				
Floor - 5	62 ft²			90.1-13 Min Floor Nonres	0.0382								Adjacent Room: 105 MENS RR				
Floor - 6	415 ft²			90.1-13 Min Floor Nonres	0.0382								Adjacent Room: 106 VCC OFFICE				
Floor - 7	65 ft²			2* Wood Floor	0.2666								Adjacent Room: 107 JANITORS				
Floor - 8	85 ft²			2* Wood Floor	0.2666								Adjacent Room: 108 STORAGE				
Floor - 9	120 ft²			2* Wood Floor	0.2666								Adjacent Room: 109 VESTIBULE				
Floor - 10	230 ft²			2* Wood Floor	0.2666								Adjacent Room: 110 MMT CARRIER				
Floor - 11	160 ft²			2* Wood Floor	0.2666								Adjacent Room: 111 TRAF CHECK IN				
Floor - 12	740 ft²			2* Wood Floor	0.2666								Adjacent Room: 112 OPEN OFFICE				
Floor - 13	350 ft²			2* Wood Floor	0.2666								Adjacent Room: 113 CONFERENCE/				
Floor - 14	250 ft²			2* Wood Floor	0.2666								Adjacent Room: 114 BREAKROOM				
Floor - 15	173 ft²			2* Wood Floor	0.2666								Adjacent Room: 116 SR TRAFFIC OF				
Floor - 16	195 ft²			2* Wood Floor	0.2666								Adjacent Room: 117 SR TRAFFIC OF				
Floor - 17	90 ft²			2* Wood Floor	0.2666								Adjacent Room: 118 FILE ROOM				
Floor - 18	110 ft²			2* Wood Floor	0.2666								Adjacent Room: 119 COMM				
Floor - 19	615 ft²			2* Wood Floor	0.2666								Adjacent Room: HALLWAY				

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 101 LOBBY | **Zone Description: Zone - 001A** | **System Description: AHU - OFFICE**

GENERAL INFORMATION

Floor Area:	860 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	12 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling (Peop-based)	Heating (Area-based)
Vent Type:	Lobbies	Lobbies
Vent Value:	5.00 cfm/person	0.06 cfm/sq ft
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Average Const.	Pressurized, Average Const.
Infil Value:	0.30 air changes/hr	0.30 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Std 62.1-2004

Cooling Ez:	Ceiling clg supply, ceiling return	100 %
Heating Ez:	Ceiling supply > Trm+15°F(8°C), ceiling return	80 %
Er:	Default based on system type	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Area ft²	Shade Coef	U Value Btu/h·ft²·°F	External Shading	Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
NORTH	174 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WINDOW				Window			90.1-2013 Window	12	0.28	0.42	Overhang - None	None	0.00				
WEST	288 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WINDOW				Window			90.1-2013 Window	24	0.28	0.42	Overhang - None	None	0.00				
Misc Load 1	500.0 W			Misc - Low rise office			Electricity							100	100	0	60.00

Room Description: 102 WOMENS RR | **Zone Description: Zone - 001A** | **System Description: AHU - OFFICE**

GENERAL INFORMATION

Floor Area:	70 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	None	None
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Area ft²	Shade Coef	U Value Btu/h·ft²·°F	External Shading	Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
NORTH	102 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 103 MENS RR | **Zone Description: Zone - 001A** | **System Description: AHU - OFFICE**

GENERAL INFORMATION

Floor Area:	65 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	NO		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	None	None
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef

Room Description: 104 WOMENS RR | **Zone Description: Zone - 001A** | **System Description: AHU - OFFICE**

GENERAL INFORMATION

Floor Area:	68 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	NO		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	None	None
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
NORTH	104 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 105 MENS RR | **Zone Description: Zone - 001A** | **System Description: AHU - OFFICE**

GENERAL INFORMATION

Floor Area: 62 ft² | Flr-Flr Height: 12.0 ft
Plenum Height: 3.0 ft | Height Above Flr:
Slab Cnstr Type: 4* LW Concrete
Room Mass: Time delay based on actual mass
Ceiling R-Value: 1.786 hr·ft²·°F/Btu
Is There Carpet?: NO
Design Clg DB / Drift Point: 74.0 °F / 78.0 °F
Design Htg DB / Drift Point: 68.0 °F / 64.0 °F
Design Relative Humidity: 50 %
Moisture Capacitance: Medium
Clg Tstat: None
Htg Tstat: None

Thermostat Location: Room | Floor Multiplier: 1
Humidistat Location: Room | Room Multiplier: 1
CO2 Sensor Location: None
Room Type: Conditioned

PEOPLE

People Type: General Office Space
# of People: 0 People
People Sensible: 250 Btu/h
People Latent : 200 Btu/h
People Schedule: People - Low Rise Office

Workstation: 0.0 workstations

LIGHTS

Lighting Type: Recessed fluorescent, not vented, 50% load to space
Fixture Type: RECFL-NV
% Load to RA: 50 %
Lighting Schedule: Lights - Low rise office
Lighting Amount: 0.800 W/sq ft
Ballast Factor: 1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	None	None
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef

Room Description: 107 JANITORS | **Zone Description: Zone - 002A** | **System Description: AHU - OFFICE**

GENERAL INFORMATION

Floor Area: 65 ft² | Flr-Flr Height: 12.0 ft
Plenum Height: 3.0 ft | Height Above Flr:
Slab Cnstr Type: 4* LW Concrete
Room Mass: Time delay based on actual mass
Ceiling R-Value: 1.786 hr·ft²·°F/Btu
Is There Carpet?: NO
Design Clg DB / Drift Point: 74.0 °F / 78.0 °F
Design Htg DB / Drift Point: 68.0 °F / 64.0 °F
Design Relative Humidity: 50 %
Moisture Capacitance: Medium
Clg Tstat: None
Htg Tstat: None

Thermostat Location: Room | Floor Multiplier: 1
Humidistat Location: Room | Room Multiplier: 1
CO2 Sensor Location: None
Room Type: Conditioned

PEOPLE

People Type: General Office Space
# of People: 0 People
People Sensible: 250 Btu/h
People Latent : 200 Btu/h
People Schedule: People - Low Rise Office

Workstation: 0.0 workstations

LIGHTS

Lighting Type: Recessed fluorescent, not vented, 50% load to space
Fixture Type: RECFL-NV
% Load to RA: 50 %
Lighting Schedule: Lights - Low rise office
Lighting Amount: 0.800 W/sq ft
Ballast Factor: 1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	None	None
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 108 STORAGE | **Zone Description: Zone - 002A** | **System Description: AHU - OFFICE**

GENERAL INFORMATION

Floor Area:	85 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	78.0 °F / 80.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling (Peop-based)	Heating (Area-based)
Vent Type:	Storage rooms	Storage rooms
Vent Value:	0.00 cfm/person	0.12 cfm/sq ft
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Std 62.1-2004

Cooling Ez:	Ceiling clg supply, ceiling return	100 %
Heating Ez:	Ceiling supply > Trm+15°F(8°C), ceiling return	80 %
Er:	Default based on system type	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: HALLWAY **Zone Description: Zone - 002A** **System Description: AHU - OFFICE**

GENERAL INFORMATION

Floor Area: 615 ft² Flr-Flr Height: 12.0 ft
Plenum Height: 3.0 ft Height Above Flr:
Slab Cnstr Type: 4* LW Concrete
Room Mass: Time delay based on actual mass
Ceiling R-Value: 1.786 hr·ft²·°F/Btu
Is There Carpet?: YES
Design Clg DB / Drift Point: 74.0 °F / 78.0 °F
Design Htg DB / Drift Point: 68.0 °F / 64.0 °F
Design Relative Humidity: 50 %
Moisture Capacitance: Medium
Clg Tstat: None
Htg Tstat: None

Thermostat Location: Room Floor Multiplier: 1
Humidistat Location: Room Room Multiplier: 1
CO2 Sensor Location: None
Room Type: Conditioned

PEOPLE

People Type: General Office Space
# of People: 0 People
People Sensible: 250 Btu/h
People Latent : 200 Btu/h
People Schedule: People - Low Rise Office

Workstation: 0.0 workstations

LIGHTS

Lighting Type: Recessed fluorescent, not vented, 50% load to space
Fixture Type: RECFL-NV
% Load to RA: 50 %
Lighting Schedule: Lights - Low rise office
Lighting Amount: 0.800 W/sq ft
Ballast Factor: 1.0

AIRFLOW INFORMATION

	Cooling (Peop-based)	Heating (Area-based)
Vent Type:	Corridors	Corridors
Vent Value:	0.00 cfm/person	0.06 cfm/sq ft
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Average Const.	Pressurized, Average Const.
Infil Value:	0.30 air changes/hr	0.30 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Std 62.1-2004

Cooling Ez: Ceiling clg supply, ceiling return 100 %
Heating Ez: Ceiling supply > Trm+15°F(8°C), ceiling return 80 %
Er: Default based on system type

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Glass Area ft²	Glass Shade Coef	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
NORTH	138 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											
DOOR WINDOW				Window			90.1-2013 Window	10	0.28	0.42	Overhang - None	None	0.00				
DOOR				Door			90.1-13 Min Swinging	16	0.00	0.37	Overhang - None	None	0.00				
EAST	284 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
SOUTH	72 ft²	180	0	90.1-13 Min Wall Nonres	0.0890	0.90											
DOOR				Door			90.1-13 Min Swinging	16	0.00	0.37	Overhang - None	None	0.00				
DOOR WINDOW				Window			90.1-2013 Window	10	0.28	0.42	Overhang - None	None	0.00				

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 106 VCC OFFICE | **Zone Description: Zone - 002B** | **System Description: AHU - OFFICE**

GENERAL INFORMATION

Floor Area: 415 ft² | Flr-Flr Height: 12.0 ft
Plenum Height: 3.0 ft | Height Above Flr:
Slab Cnstr Type: 4* LW Concrete
Room Mass: Time delay based on actual mass
Ceiling R-Value: 1.786 hr·ft²·°F/Btu
Is There Carpet?: NO
Design Clg DB / Drift Point: 74.0 °F / 78.0 °F
Design Htg DB / Drift Point: 68.0 °F / 64.0 °F
Design Relative Humidity: 50 %
Moisture Capacitance: Medium
Clg Tstat: None
Htg Tstat: None

Thermostat Location: Room | Floor Multiplier: 1
Humidistat Location: Room | Room Multiplier: 1
CO2 Sensor Location: None
Room Type: Conditioned

PEOPLE

People Type: General Office Space
# of People: 2 People
People Sensible: 250 Btu/h
People Latent : 200 Btu/h
People Schedule: People - Low Rise Office

Workstation: 1.0 workstation/person

LIGHTS

Lighting Type: Recessed fluorescent, not vented, 50% load to space
Fixture Type: RECFL-NV
% Load to RA: 50 %
Lighting Schedule: Lights - Low rise office
Lighting Amount: 0.800 W/sq ft
Ballast Factor: 1.0

AIRFLOW INFORMATION

	Cooling (Peop-based)	Heating (Area-based)
Vent Type:	Office space	Office space
Vent Value:	5.00 cfm/person	0.06 cfm/sq ft
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Std 62.1-2004

Cooling Ez: Ceiling clg supply, ceiling return 100 %
Heating Ez: Ceiling supply > Trm+15°F(8°C), ceiling return 80 %
Er: Default based on system type

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
Misc Load 1	200.0 W			Misc - Low rise office			Electricity							100	100	0	60.00
Misc Load 2	150.0 Watts/worksta			Misc - Low rise office			Electricity							100	100	0	60.00

Room Description: 114 BREAKROOM | **Zone Description: Zone - 002C** | **System Description: AHU - OFFICE**

GENERAL INFORMATION

Floor Area: 250 ft² | Flr-Flr Height: 12.0 ft
Plenum Height: 3.0 ft | Height Above Flr:
Slab Cnstr Type: 4* LW Concrete
Room Mass: Time delay based on actual mass
Ceiling R-Value: 1.786 hr·ft²·°F/Btu
Is There Carpet?: NO
Design Clg DB / Drift Point: 74.0 °F / 78.0 °F
Design Htg DB / Drift Point: 68.0 °F / 64.0 °F
Design Relative Humidity: 50 %
Moisture Capacitance: Medium
Clg Tstat: None
Htg Tstat: None

Thermostat Location: Room | Floor Multiplier: 1
Humidistat Location: Room | Room Multiplier: 1
CO2 Sensor Location: None
Room Type: Conditioned

PEOPLE

People Type: General Office Space
# of People: 143 sq ft/person
People Sensible: 250 Btu/h
People Latent : 200 Btu/h
People Schedule: People - Low Rise Office

Workstation: 0.0 workstations

LIGHTS

Lighting Type: Recessed fluorescent, not vented, 50% load to space
Fixture Type: RECFL-NV
% Load to RA: 50 %
Lighting Schedule: Lights - Low rise office
Lighting Amount: 0.800 W/sq ft
Ballast Factor: 1.0

AIRFLOW INFORMATION

	Cooling (Peop-based)	Heating (Area-based)
Vent Type:	Break Rooms	Break Rooms
Vent Value:	5.00 cfm/person	0.06 cfm/sq ft
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Std 62.1-2004

Cooling Ez: Ceiling clg supply, ceiling return 100 %
Heating Ez: Ceiling supply > Trm+15°F(8°C), ceiling return 80 %
Er: Default based on system type

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
Misc Load 1	500.0 W			Misc - Low rise office			Electricity							100	100	0	60.00

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 113 CONFERENCE/TRAINING | **Zone Description: Zone - 003A** | **System Description: AHU - OFFICE**

GENERAL INFORMATION

Floor Area:	350 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	14 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling (Peop-based)	Heating (Area-based)
Vent Type:	Conference/ meeting	Conference/ meeting
Vent Value:	5.00 cfm/person	0.06 cfm/sq ft
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Std 62.1-2004

Cooling Ez:	Ceiling clg supply, ceiling return	100 %
Heating Ez:	Ceiling supply > Trm+15°F(8°C), ceiling return	80 %
Er:	Default based on system type	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
Misc Load 1	320.0 W			Misc - Low rise office			Electricity							100	100	0	60.00

Room Description: 110 MMT CARRIER | **Zone Description: Zone - 004A** | **System Description: AHU - OFFICE**

GENERAL INFORMATION

Floor Area:	230 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	2 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	1.0 workstation/person

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling (Peop-based)	Heating (Area-based)
Vent Type:	Office space	Office space
Vent Value:	5.00 cfm/person	0.06 cfm/sq ft
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Std 62.1-2004

Cooling Ez:	Ceiling clg supply, ceiling return	100 %
Heating Ez:	Ceiling supply > Trm+15°F(8°C), ceiling return	80 %
Er:	Default based on system type	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
WEST	220 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											
Misc Load 1	150.0 Watts/worksta			Misc - Low rise office			Electricity							100	100	0	60.00

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 111 TRAF CHECK IN **Zone Description: Zone - 004B** **System Description: AHU - OFFICE**

GENERAL INFORMATION

Floor Area:	160 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	1 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	1.0 workstation/person

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling (Peop-based)	Heating (Area-based)
Vent Type:	Office space	Office space
Vent Value:	5.00 cfm/person	0.06 cfm/sq ft
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Std 62.1-2004

Cooling Ez:	Ceiling clg supply, ceiling return	100 %
Heating Ez:	Ceiling supply > Trm+15°F(8°C), ceiling return	80 %
Er:	Default based on system type	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
Misc Load 1	150.0 Watts/worksta			Misc - Low rise office			Electricity							100	100	0	60.00

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 112 OPEN OFFICE **Zone Description: Zone - 004B** **System Description: AHU - OFFICE**

GENERAL INFORMATION

Floor Area:	740 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	6 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	1.0 workstation/person

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling (Peop-based)	Heating (Area-based)
Vent Type:	Office space	Office space
Vent Value:	5.00 cfm/person	0.06 cfm/sq ft
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Std 62.1-2004

Cooling Ez:	Ceiling clg supply, ceiling return	100 %
Heating Ez:	Ceiling supply > Trm+15°F(8°C), ceiling return	80 %
Er:	Default based on system type	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Glass Area ft²	Glass Shade Coef	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
WEST	210 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											
SOUTH	483 ft²	180	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WINDOW				Window			90.1-2013 Window	36	0.28	0.42	Overhang - None	None	0.00				
EAST	60 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
Copier	400.0 W			Misc - Low rise office			Electricity							100	100	0	60.00
Misc Load 2	150.0 Watts/worksta			Misc - Low rise office			Electricity							100	100	0	60.00

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 116 SR TRAFFIC OFFICE **Zone Description: Zone - 005A** **System Description: AHU - OFFICE**

GENERAL INFORMATION

Floor Area:	173 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	1 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	1.0 workstation/person

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling (Peop-based)	Heating (Area-based)
Vent Type:	Office space	Office space
Vent Value:	5.00 cfm/person	0.06 cfm/sq ft
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Std 62.1-2004

Cooling Ez:	Ceiling clg supply, ceiling return	100 %
Heating Ez:	Ceiling supply > Trm+15°F(8°C), ceiling return	80 %
Er:	Default based on system type	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Glass Area ft²	Glass Shade Coef	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
WEST	60 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											
SOUTH	171 ft²	180	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WINDOW				Window			90.1-2013 Window	12	0.28	0.42	Overhang - None	None	0.00				
Misc Load 1	150.0 Watts/worksta			Misc - Low rise office			Electricity							100	100	0	60.00

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 117 SR TRAFFIC OFFICE | **Zone Description: Zone - 005A** | **System Description: AHU - OFFICE**

GENERAL INFORMATION

Floor Area:	195 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	1 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	1.0 workstation/person

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling (Peop-based)	Heating (Area-based)
Vent Type:	Office space	Office space
Vent Value:	5.00 cfm/person	0.06 cfm/sq ft
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Std 62.1-2004

Cooling Ez:	Ceiling clg supply, ceiling return	100 %
Heating Ez:	Ceiling supply > Trm+15°F(8°C), ceiling return	80 %
Er:	Default based on system type	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Area ft²	Shade Coef	U Value Btu/h·ft²·°F	External Shading	Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
SOUTH	186 ft²	180	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WINDOW				Window			90.1-2013 Window	12	0.28	0.42	Overhang - None	None	0.00				
EAST	150 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WINDOW				Window			90.1-2013 Window	12	0.28	0.42	Overhang - None	None	0.00				
Misc Load 1	150.0 Watts/worksta			Misc - Low rise office			Electricity							100	100	0	60.00

Room Description: 118 FILE ROOM | **Zone Description: Zone - 005A** | **System Description: AHU - OFFICE**

GENERAL INFORMATION

Floor Area:	90 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	78.0 °F / 80.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling (Peop-based)	Heating (Area-based)
Vent Type:	Storage rooms	Storage rooms
Vent Value:	0.00 cfm/person	0.12 cfm/sq ft
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Std 62.1-2004

Cooling Ez:	Ceiling clg supply, ceiling return	100 %
Heating Ez:	Ceiling supply > Trm+15°F(8°C), ceiling return	80 %
Er:	Default based on system type	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Area ft²	Shade Coef	U Value Btu/h·ft²·°F	External Shading	Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
EAST	104 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 120 MECH/ELEC ROOM | **Zone Description: Zone - 006A** | **System Description: SS-1**

GENERAL INFORMATION

Floor Area:	180 ft²	Flr-Flr Height:	17.8 ft
Plenum Height:	0.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	80.0 °F / 85.0 °F		
Design Htg DB / Drift Point:	55.0 °F / 50.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	LED Lighting 100% load to space
Fixture Type:	LED Lighting
% Load to RA:	0 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Neutral, Tight Const.	Neutral, Tight Const.
Infil Value:	0.30 air changes/hr	0.30 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
Roof - 1	180 ft²	0	67	90.1-13 Min Roof Nonres	0.0270	0.45		0			Overhang - None	None					
EAST	204 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
DOOR				Door			90.1-13 Min Swinging	21	0.00	0.37	Overhang - None	None	0.00				
NORTH	114 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											

Room Description: 119 COMM | **Zone Description: Zone - 007A** | **System Description: SS-2**

GENERAL INFORMATION

Floor Area:	110 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	NO		
Design Clg DB / Drift Point:	74.0 °F / 74.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 68.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
EAST	126 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
Misc Load 1	0.50 tons			Misc - Surgery hospital			Electricity							100	100	0	60.00

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 100 VESTIBULE **Zone Description: No Zone** **System Description: UH-1**

GENERAL INFORMATION

Floor Area:	92 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	NO		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Average Const.	Pressurized, Average Const.
Infil Value:	0.30 air changes/hr	0.30 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
Roof - 1	92 ft²	0	90	90.1-13 Min Roof Nonres	0.0270	0.45		0			Overhang - None	None					
NORTH	144 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											
DOOR				Door			90.1-13 Min Swinging	26	0.00	0.37	Overhang - None	None	0.00				
DOOR WINDOW				Window			90.1-2013 Window	20	0.28	0.42	Overhang - None	None	0.00				
EAST	92 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WEST	92 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 109 VESTIBULE **Zone Description: No Zone** **System Description: UH-2**

GENERAL INFORMATION

Floor Area:	120 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Average Const.	Pressurized, Average Const.
Infil Value:	0.30 air changes/hr	0.30 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Glass Area ft²	Glass Shade Coef	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
NORTH	114 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WEST	156 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											
DOOR WINDOW				Window			90.1-2013 Window	20	0.28	0.42	Overhang - None	None	0.00				
DOOR				Door			90.1-13 Min Swinging	26	0.00	0.37	Overhang - None	None	0.00				

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 101 LOBBY | **Zone Description: No Zone** | **System Description: RTU-1**

GENERAL INFORMATION

Floor Area:	860 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	12 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling (Peop-based)	Heating (Area-based)
Vent Type:	Lobbies	Lobbies
Vent Value:	5.00 cfm/person	0.06 cfm/sq ft
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Average Const.	Pressurized, Average Const.
Infil Value:	0.30 air changes/hr	0.30 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Std 62.1-2004

Cooling Ez:	Ceiling clg supply, ceiling return	100 %
Heating Ez:	Ceiling supply > Trm+15°F(8°C), ceiling return	80 %
Er:	Default based on system type	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Area ft²	Shade Coef	U Value Btu/h·ft²·°F	External Shading	Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
NORTH	174 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WINDOW				Window			90.1-2013 Window	12	0.28	0.42	Overhang - None	None	0.00				
WEST	288 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WINDOW				Window			90.1-2013 Window	24	0.28	0.42	Overhang - None	None	0.00				
Misc Load 1	500.0 W			Misc - Low rise office			Electricity							100	100	0	60.00

Room Description: 102 WOMENS RR | **Zone Description: No Zone** | **System Description: RTU-1**

GENERAL INFORMATION

Floor Area:	70 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	NO		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	None	None
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Area ft²	Shade Coef	U Value Btu/h·ft²·°F	External Shading	Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
NORTH	102 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 103 MENS RR | **Zone Description: No Zone** | **System Description: RTU-1**

GENERAL INFORMATION

Floor Area:	65 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	NO		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	None	None
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef

Room Description: 104 WOMENS RR | **Zone Description: No Zone** | **System Description: RTU-1**

GENERAL INFORMATION

Floor Area:	68 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	NO		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	None	None
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
NORTH	104 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 105 MENS RR | **Zone Description: No Zone** | **System Description: RTU-1**

GENERAL INFORMATION

Floor Area:	62 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	NO		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	None	None
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
Misc Load 1	200.0 W			Misc - Low rise office			Electricity							100	100	0	60.00
Misc Load 2	150.0 Watts/worksta			Misc - Low rise office			Electricity							100	100	0	60.00

Room Description: 106 VCC OFFICE | **Zone Description: No Zone** | **System Description: RTU-1**

GENERAL INFORMATION

Floor Area:	415 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	2 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	1.0 workstation/person

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling (Peop-based)	Heating (Area-based)
Vent Type:	Office space	Office space
Vent Value:	5.00 cfm/person	0.06 cfm/sq ft
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Std 62.1-2004

Cooling Ez:	Ceiling clg supply, ceiling return	100 %
Heating Ez:	Ceiling supply > Trm+15°F(8°C), ceiling return	80 %
Er:	Default based on system type	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
Misc Load 1	200.0 W			Misc - Low rise office			Electricity							100	100	0	60.00
Misc Load 2	150.0 Watts/worksta			Misc - Low rise office			Electricity							100	100	0	60.00

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 107 JANITORS | **Zone Description: No Zone** | **System Description: RTU-1**

GENERAL INFORMATION

Floor Area:	65 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	NO		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	None	None
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef

Room Description: 108 STORAGE | **Zone Description: No Zone** | **System Description: RTU-1**

GENERAL INFORMATION

Floor Area:	85 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	78.0 °F / 80.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling (Peop-based)	Heating (Area-based)
Vent Type:	Storage rooms	Storage rooms
Vent Value:	0.00 cfm/person	0.12 cfm/sq ft
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Std 62.1-2004

Cooling Ez:	Ceiling clg supply, ceiling return	100 %
Heating Ez:	Ceiling supply > Trm+15°F(8°C), ceiling return	80 %
Er:	Default based on system type	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 114 BREAKROOM **Zone Description: No Zone** **System Description: RTU-1**

GENERAL INFORMATION

Floor Area:	250 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	NO		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	143 sq ft/person
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling (Peop-based)	Heating (Area-based)
Vent Type:	Break Rooms	Break Rooms
Vent Value:	5.00 cfm/person	0.06 cfm/sq ft
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Std 62.1-2004

Cooling Ez:	Ceiling clg supply, ceiling return	100 %
Heating Ez:	Ceiling supply > Trm+15°F(8°C), ceiling return	80 %
Er:	Default based on system type	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
Misc Load 1	500.0 W			Misc - Low rise office			Electricity							100	100	0	60.00

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: HALLWAY **Zone Description: No Zone** **System Description: RTU-1**

GENERAL INFORMATION

Floor Area: 615 ft² Flr-Flr Height: 12.0 ft
Plenum Height: 3.0 ft Height Above Flr:
Slab Cnstr Type: 4* LW Concrete
Room Mass: Time delay based on actual mass
Ceiling R-Value: 1.786 hr·ft²·°F/Btu
Is There Carpet?: YES
Design Clg DB / Drift Point: 74.0 °F / 78.0 °F
Design Htg DB / Drift Point: 68.0 °F / 64.0 °F
Design Relative Humidity: 50 %
Moisture Capacitance: Medium
Clg Tstat: None
Htg Tstat: None

Thermostat Location: Room Floor Multiplier: 1
Humidistat Location: Room Room Multiplier: 1
CO2 Sensor Location: None
Room Type: Conditioned

PEOPLE

People Type: General Office Space
# of People: 0 People
People Sensible: 250 Btu/h
People Latent : 200 Btu/h
People Schedule: People - Low Rise Office

Workstation: 0.0 workstations

LIGHTS

Lighting Type: Recessed fluorescent, not vented, 50% load to space
Fixture Type: RECFL-NV
% Load to RA: 50 %
Lighting Schedule: Lights - Low rise office
Lighting Amount: 0.800 W/sq ft
Ballast Factor: 1.0

AIRFLOW INFORMATION

	Cooling (Peop-based)	Heating (Area-based)
Vent Type:	Corridors	Corridors
Vent Value:	0.00 cfm/person	0.06 cfm/sq ft
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Average Const.	Pressurized, Average Const.
Infil Value:	0.30 air changes/hr	0.30 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Std 62.1-2004

Cooling Ez: Ceiling clg supply, ceiling return 100 %
Heating Ez: Ceiling supply > Trm+15°F(8°C), ceiling return 80 %
Er: Default based on system type

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Glass Area ft²	Glass Shade Coef	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
NORTH	138 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											
DOOR WINDOW				Window			90.1-2013 Window	10	0.28	0.42	Overhang - None	None	0.00				
DOOR				Door			90.1-13 Min Swinging	16	0.00	0.37	Overhang - None	None	0.00				
EAST	284 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
SOUTH	72 ft²	180	0	90.1-13 Min Wall Nonres	0.0890	0.90											
DOOR				Door			90.1-13 Min Swinging	16	0.00	0.37	Overhang - None	None	0.00				
DOOR WINDOW				Window			90.1-2013 Window	10	0.28	0.42	Overhang - None	None	0.00				

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 110 MMT CARRIER | **Zone Description: No Zone** | **System Description: RTU-2**

GENERAL INFORMATION

Floor Area:	230 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	2 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	1.0 workstation/person

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling (Peop-based)	Heating (Area-based)
Vent Type:	Office space	Office space
Vent Value:	5.00 cfm/person	0.06 cfm/sq ft
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Std 62.1-2004

Cooling Ez:	Ceiling clg supply, ceiling return	100 %
Heating Ez:	Ceiling supply > Trm+15°F(8°C), ceiling return	80 %
Er:	Default based on system type	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
WEST	220 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											
Misc Load 1	150.0 Watts/worksta			Misc - Low rise office			Electricity							100	100	0	60.00

Room Description: 111 TRAF CHECK IN | **Zone Description: No Zone** | **System Description: RTU-2**

GENERAL INFORMATION

Floor Area:	160 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	1 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	1.0 workstation/person

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling (Peop-based)	Heating (Area-based)
Vent Type:	Office space	Office space
Vent Value:	5.00 cfm/person	0.06 cfm/sq ft
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Std 62.1-2004

Cooling Ez:	Ceiling clg supply, ceiling return	100 %
Heating Ez:	Ceiling supply > Trm+15°F(8°C), ceiling return	80 %
Er:	Default based on system type	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
Misc Load 1	150.0 Watts/worksta			Misc - Low rise office			Electricity							100	100	0	60.00

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 112 OPEN OFFICE **Zone Description: No Zone** **System Description: RTU-2**

GENERAL INFORMATION

Floor Area: 740 ft² Flr-Flr Height: 12.0 ft
Plenum Height: 3.0 ft Height Above Flr:
Slab Cnstr Type: 4* LW Concrete
Room Mass: Time delay based on actual mass
Ceiling R-Value: 1.786 hr·ft²·°F/Btu
Is There Carpet?: YES
Design Clg DB / Drift Point: 74.0 °F / 78.0 °F
Design Htg DB / Drift Point: 68.0 °F / 64.0 °F
Design Relative Humidity: 50 %
Moisture Capacitance: Medium
Clg Tstat: None
Htg Tstat: None

Thermostat Location: Room Floor Multiplier: 1
Humidistat Location: Room Room Multiplier: 1
CO2 Sensor Location: None
Room Type: Conditioned

PEOPLE

People Type: General Office Space
# of People: 6 People
People Sensible: 250 Btu/h
People Latent : 200 Btu/h
People Schedule: People - Low Rise Office

Workstation: 1.0 workstation/person

LIGHTS

Lighting Type: Recessed fluorescent, not vented, 50% load to space
Fixture Type: RECFL-NV
% Load to RA: 50 %
Lighting Schedule: Lights - Low rise office
Lighting Amount: 0.800 W/sq ft
Ballast Factor: 1.0

AIRFLOW INFORMATION

	Cooling (Peop-based)	Heating (Area-based)
Vent Type:	Office space	Office space
Vent Value:	5.00 cfm/person	0.06 cfm/sq ft
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Std 62.1-2004

Cooling Ez: Ceiling clg supply, ceiling return 100 %
Heating Ez: Ceiling supply > Trm+15°F(8°C), ceiling return 80 %
Er: Default based on system type

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Glass Area ft²	Glass Shade Coef	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
WEST	210 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											
SOUTH	483 ft²	180	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WINDOW				Window			90.1-2013 Window	36	0.28	0.42	Overhang - None	None	0.00				
EAST	60 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
Copier	400.0 W			Misc - Low rise office			Electricity							100	100	0	60.00
Misc Load 2	150.0 Watts/worksta			Misc - Low rise office			Electricity							100	100	0	60.00

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 113 CONFERENCE/TRAINING | **Zone Description: No Zone** | **System Description: RTU-2**

GENERAL INFORMATION

Floor Area:	350 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	14 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling (Peop-based)	Heating (Area-based)
Vent Type:	Conference/ meeting	Conference/ meeting
Vent Value:	5.00 cfm/person	0.06 cfm/sq ft
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Std 62.1-2004

Cooling Ez:	Ceiling clg supply, ceiling return	100 %
Heating Ez:	Ceiling supply > Trm+15°F(8°C), ceiling return	80 %
Er:	Default based on system type	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
Misc Load 1	320.0 W			Misc - Low rise office			Electricity							100	100	0	60.00

Room Description: 116 SR TRAFFIC OFFICE | **Zone Description: No Zone** | **System Description: RTU-2**

GENERAL INFORMATION

Floor Area:	173 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	1 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	1.0 workstation/person

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling (Peop-based)	Heating (Area-based)
Vent Type:	Office space	Office space
Vent Value:	5.00 cfm/person	0.06 cfm/sq ft
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Std 62.1-2004

Cooling Ez:	Ceiling clg supply, ceiling return	100 %
Heating Ez:	Ceiling supply > Trm+15°F(8°C), ceiling return	80 %
Er:	Default based on system type	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass: Type / Energy Type	Glass: Area ft²	Glass: Shade Coef	Glass: U Value Btu/h·ft²·°F	Glass: External Shading	Glass: Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
WEST	60 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											
SOUTH	171 ft²	180	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WINDOW				Window			90.1-2013 Window	12	0.28	0.42	Overhang - None	None	0.00				
Misc Load 1	150.0 Watts/worksta			Misc - Low rise office			Electricity							100	100	0	60.00

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 117 SR TRAFFIC OFFICE | **Zone Description: No Zone** | **System Description: RTU-2**

GENERAL INFORMATION

Floor Area:	195 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	1 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	1.0 workstation/person

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling (Peop-based)	Heating (Area-based)
Vent Type:	Office space	Office space
Vent Value:	5.00 cfm/person	0.06 cfm/sq ft
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Std 62.1-2004

Cooling Ez:	Ceiling clg supply, ceiling return	100 %
Heating Ez:	Ceiling supply > Trm+15°F(8°C), ceiling return	80 %
Er:	Default based on system type	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Area ft²	Shade Coef	U Value Btu/h·ft²·°F	External Shading	Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
SOUTH	186 ft²	180	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WINDOW				Window			90.1-2013 Window	12	0.28	0.42	Overhang - None	None	0.00				
EAST	150 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WINDOW				Window			90.1-2013 Window	12	0.28	0.42	Overhang - None	None	0.00				
Misc Load 1	150.0 Watts/worksta			Misc - Low rise office			Electricity							100	100	0	60.00

Room Description: 118 FILE ROOM | **Zone Description: No Zone** | **System Description: RTU-2**

GENERAL INFORMATION

Floor Area:	90 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	78.0 °F / 80.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling (Peop-based)	Heating (Area-based)
Vent Type:	Storage rooms	Storage rooms
Vent Value:	0.00 cfm/person	0.12 cfm/sq ft
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Std 62.1-2004

Cooling Ez:	Ceiling clg supply, ceiling return	100 %
Heating Ez:	Ceiling supply > Trm+15°F(8°C), ceiling return	80 %
Er:	Default based on system type	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Area ft²	Shade Coef	U Value Btu/h·ft²·°F	External Shading	Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
EAST	104 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: ATTIC | **Zone Description: No Zone** | **System Description: RTU-2**

GENERAL INFORMATION

Floor Area:	4,710 ft²	Flr-Flr Height:	7.6 ft
Plenum Height:	0.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	NO		
Design Clg DB / Drift Point:	80.0 °F / 85.0 °F		
Design Htg DB / Drift Point:	50.0 °F / 45.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	None		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	None	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Unconditioned		

PEOPLE

People Type:	None
# of People:	0 sq ft/person
People Sensible:	250 Btu/h
People Latent :	250 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	1.0 workstation/person

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 80% load to space
Fixture Type:	RECFL-NV
% Load to RA:	20 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.000 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	None	None
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

ENTERED VALUES

ROOM BY ROOM

By HDR

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Glass Area ft²	Glass Shade Coef	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
NORTH	1,120 ft²	0	67	90.1-13 Min Roof Nonres	0.0270	0.45		0			Overhang - None	None					
EAST	945 ft²	90	69	90.1-13 Min Roof Nonres	0.0270	0.45		0			Overhang - None	None					
SOUTH	1,735 ft²	180	67	90.1-13 Min Roof Nonres	0.0270	0.45		0			Overhang - None	None					
WEST	945 ft²	270	69	90.1-13 Min Roof Nonres	0.0270	0.45		0			Overhang - None	None					
NORTH - LARGE	392 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											
EAST- SMALL	24 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
SOUTH	76 ft²	180	0	90.1-13 Min Wall Nonres	0.0890	0.90											
EAST - LARGE	239 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WEST - LARGE	372 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WEST - SMALL	24 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											
NORTH - SMALL	25 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											
Floor - 1	860 ft²			2* Wood Floor	0.2666								Adjacent Room: 101 LOBBY				
Floor - 2	70 ft²			2* Wood Floor	0.2666								Adjacent Room: 102 WOMENS RR				
Floor - 3	65 ft²			2* Wood Floor	0.2666								Adjacent Room: 103 MENS RR				
Floor - 4	68 ft²			2* Wood Floor	0.2666								Adjacent Room: 104 WOMENS RR				
Floor - 5	62 ft²			2* Wood Floor	0.2666								Adjacent Room: 105 MENS RR				
Floor - 6	415 ft²			2* Wood Floor	0.2666								Adjacent Room: 106 VCC OFFICE				
Floor - 7	65 ft²			2* Wood Floor	0.2666								Adjacent Room: 107 JANITORS				
Floor - 8	85 ft²			2* Wood Floor	0.2666								Adjacent Room: 108 STORAGE				
Floor - 9	120 ft²			2* Wood Floor	0.2666								Adjacent Room: 109 VESTIBULE				
Floor - 10	230 ft²			2* Wood Floor	0.2666								Adjacent Room: 110 MMT CARRIER				
Floor - 11	160 ft²			2* Wood Floor	0.2666								Adjacent Room: 111 TRAF CHECK IN				
Floor - 12	740 ft²			2* Wood Floor	0.2666								Adjacent Room: 112 OPEN OFFICE				
Floor - 13	350 ft²			2* Wood Floor	0.2666								Adjacent Room: 113 CONFERENCE/				
Floor - 14	250 ft²			2* Wood Floor	0.2666								Adjacent Room: 114 BREAKROOM				
Floor - 15	173 ft²			2* Wood Floor	0.2666								Adjacent Room: 116 SR TRAFFIC OF				
Floor - 16	195 ft²			2* Wood Floor	0.2666								Adjacent Room: 117 SR TRAFFIC OF				
Floor - 17	90 ft²			2* Wood Floor	0.2666								Adjacent Room: 118 FILE ROOM				
Floor - 18	110 ft²			2* Wood Floor	0.2666								Adjacent Room: 119 COMM				
Floor - 19	615 ft²			2* Wood Floor	0.2666								Adjacent Room: HALLWAY				

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 120 MECH/ELEC ROOM | **Zone Description: No Zone** | **System Description: SS-1**

GENERAL INFORMATION

Floor Area:	180 ft²	Flr-Flr Height:	17.8 ft
Plenum Height:	0.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	80.0 °F / 85.0 °F		
Design Htg DB / Drift Point:	55.0 °F / 50.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	LED Lighting 100% load to space
Fixture Type:	LED Lighting
% Load to RA:	0 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Neutral, Tight Const.	Neutral, Tight Const.
Infil Value:	0.30 air changes/hr	0.30 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Glass Area ft²	Glass Shade Coef	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
Roof - 1	180 ft²	0	67	90.1-13 Min Roof Nonres	0.0270	0.45		0			Overhang - None	None					
EAST	204 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
DOOR				Door			90.1-13 Min Swinging	21	0.00	0.37	Overhang - None	None	0.00				
NORTH	114 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											

Room Description: 119 COMM | **Zone Description: No Zone** | **System Description: SS-2**

GENERAL INFORMATION

Floor Area:	110 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	NO		
Design Clg DB / Drift Point:	74.0 °F / 74.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 68.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Tight Const.	Pressurized, Tight Const.
Infil Value:	0.00 air changes/hr	0.00 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Glass Area ft²	Glass Shade Coef	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
EAST	126 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
Misc Load 1	0.50 tons			Misc - Surgery hospital			Electricity							100	100	0	60.00

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 100 VESTIBULE **Zone Description: No Zone** **System Description: UH-1**

GENERAL INFORMATION

Floor Area:	92 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	NO		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Average Const.	Pressurized, Average Const.
Infil Value:	0.30 air changes/hr	0.30 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Glass Area ft²	Glass Shade Coef	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
Roof - 1	92 ft²	0	90	90.1-13 Min Roof Nonres	0.0270	0.45		0			Overhang - None	None					
NORTH	144 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											
DOOR				Door			90.1-13 Min Swinging	26	0.00	0.37	Overhang - None	None	0.00				
DOOR WINDOW				Window			90.1-2013 Window	20	0.28	0.42	Overhang - None	None	0.00				
EAST	92 ft²	90	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WEST	92 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											

ENTERED VALUES

ROOM BY ROOM

By HDR

Room Description: 109 VESTIBULE **Zone Description: No Zone** **System Description: UH-2**

GENERAL INFORMATION

Floor Area:	120 ft²	Flr-Flr Height:	12.0 ft
Plenum Height:	3.0 ft	Height Above Flr:	
Slab Cnstr Type:	4* LW Concrete		
Room Mass:	Time delay based on actual mass		
Ceiling R-Value:	1.786 hr·ft²·°F/Btu		
Is There Carpet?:	YES		
Design Clg DB / Drift Point:	74.0 °F / 78.0 °F		
Design Htg DB / Drift Point:	68.0 °F / 64.0 °F		
Design Relative Humidity:	50 %		
Moisture Capacitance:	Medium		
Clg Tstat:	None		
Htg Tstat:	None		
Thermostat Location:	Room	Floor Multiplier:	1
Humidistat Location:	Room	Room Multiplier:	1
CO2 Sensor Location:	None		
Room Type:	Conditioned		

PEOPLE

People Type:	General Office Space
# of People:	0 People
People Sensible:	250 Btu/h
People Latent :	200 Btu/h
People Schedule:	People - Low Rise Office
Workstation:	0.0 workstations

LIGHTS

Lighting Type:	Recessed fluorescent, not vented, 50% load to space
Fixture Type:	RECFL-NV
% Load to RA:	50 %
Lighting Schedule:	Lights - Low rise office
Lighting Amount:	0.800 W/sq ft
Ballast Factor:	1.0

AIRFLOW INFORMATION

	Cooling	Heating
Vent Type:	None	None
Vent Value:	0.00 cfm	0.00 cfm
Vent Schedule:	Available (100%)	
Infil Type:	Pressurized, Average Const.	Pressurized, Average Const.
Infil Value:	0.30 air changes/hr	0.30 air changes/hr
Infil Schedule:	Available (100%)	
Vav Airflow:		
Vav Sched:	Available (100%)	
Supply:	To be calculated	To be calculated
Aux Supply:	To be calculated	To be calculated
Room Exhaust:		
Rm Exh Sched:	Available (100%)	

Description	Area/ Amount	Dir	Tilt	Const Type / Schedule	U Value Btu/h·ft²·°F	Alpha	Glass Type / Energy Type	Glass Area ft²	Glass Shade Coef	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading	Adj Temp/ Grnd Refl	Pct Sen/ Cool Tmp	Pct Rm/ Heat Tmp	Pct Ret/ Perm Len	Rad Frc/ Loss Coef
NORTH	114 ft²	0	0	90.1-13 Min Wall Nonres	0.0890	0.90											
WEST	156 ft²	270	0	90.1-13 Min Wall Nonres	0.0890	0.90											
DOOR WINDOW				Window			90.1-2013 Window	20	0.28	0.42	Overhang - None	None	0.00				
DOOR				Door			90.1-13 Min Swinging	26	0.00	0.37	Overhang - None	None	0.00				

ENTERED VALUES

ROOM ASSIGNMENTS

By HDR

ASSIGNED ROOMS

Description

- AHU - OFFICE
  - ATTIC
  - Zone - 001A
    - 101 LOBBY
    - 102 WOMENS RR
    - 103 MENS RR
    - 104 WOMENS RR
    - 105 MENS RR
  - Zone - 002A
    - 107 JANITORS
    - 108 STORAGE
    - HALLWAY
  - Zone - 002B
    - 106 VCC OFFICE
  - Zone - 002C
    - 114 BREAKROOM
  - Zone - 003A
    - 113 CONFERENCE/TRAINING
  - Zone - 004A
    - 110 MMT CARRIER
  - Zone - 004B
    - 111 TRAF CHECK IN
    - 112 OPEN OFFICE
  - Zone - 005A
    - 116 SR TRAFFIC OFFICE
    - 117 SR TRAFFIC OFFICE
    - 118 FILE ROOM
- HEAT PUMPS
  - ATTIC
  - Zone - 001A
    - 101 LOBBY
    - 102 WOMENS RR
    - 103 MENS RR
    - 104 WOMENS RR
    - 105 MENS RR
  - Zone - 002A
    - 107 JANITORS
    - 108 STORAGE
    - HALLWAY
  - Zone - 002B
    - 106 VCC OFFICE
  - Zone - 002C
    - 114 BREAKROOM
  - Zone - 003A
    - 113 CONFERENCE/TRAINING
  - Zone - 004A
    - 110 MMT CARRIER
  - Zone - 004B
    - 111 TRAF CHECK IN
    - 112 OPEN OFFICE
  - Zone - 005A
    - 116 SR TRAFFIC OFFICE
    - 117 SR TRAFFIC OFFICE
    - 118 FILE ROOM
- RTU-1
  - 101 LOBBY
  - 102 WOMENS RR
  - 103 MENS RR
  - 104 WOMENS RR
  - 105 MENS RR
  - 106 VCC OFFICE
  - 107 JANITORS
  - 108 STORAGE
  - 114 BREAKROOM
  - HALLWAY
- RTU-2
  - 110 MMT CARRIER
  - 111 TRAF CHECK IN
  - 112 OPEN OFFICE

ENTERED VALUES

ROOM ASSIGNMENTS

By HDR

113 CONFERENCE/TRAINING
116 SR TRAFFIC OFFICE
117 SR TRAFFIC OFFICE
118 FILE ROOM
ATTIC
SS-1
SS-1
SS-1
120 MECH/ELEC ROOM
Zone - 006A
Zone - 006A
120 MECH/ELEC ROOM
120 MECH/ELEC ROOM
SS-2
SS-2
SS-2
119 COMM
Zone - 007A
Zone - 007A
119 COMM
119 COMM
UH-1
UH-1
UH-1
UH-1
100 VESTIBULE
100 VESTIBULE
100 VESTIBULE
100 VESTIBULE
UH-2
UH-2
UH-2
UH-2
109 VESTIBULE
109 VESTIBULE
109 VESTIBULE
109 VESTIBULE
VRF
ATTIC
Zone - 001A
101 LOBBY
102 WOMENS RR
103 MENS RR
104 WOMENS RR
105 MENS RR
Zone - 002A
107 JANITORS
108 STORAGE
HALLWAY
Zone - 002B
106 VCC OFFICE
Zone - 002C
114 BREAKROOM
Zone - 003A
113 CONFERENCE/TRAINING
Zone - 004A
110 MMT CARRIER
Zone - 004B
111 TRAF CHECK IN
112 OPEN OFFICE
Zone - 005A
116 SR TRAFFIC OFFICE
117 SR TRAFFIC OFFICE
118 FILE ROOM
Zone - 006A
120 MECH/ELEC ROOM
Zone - 007A
119 COMM

Library Members

Exposed Floor - Construction Types

2" Wood Floor

Layer	Code	Description	Thickness	Conductivity	Density	Specific Heat	Resistance
1	E0	Inside Surface Resist.					0.69 ft²·hr·°F/Btu
2	D2	2 in. Wood	2.00 in.	0.07 Btu/hr·ft·°F	37.00 lb/cu ft	0.60 Btu/lb·°F	
3	E0	Inside Surface Resist.					0.69 ft²·hr·°F/Btu

Lamda = 0.87 Weight = 6.17 lb/ft² U-Value = 0.267 Btu/hr·ft²·°F Alpha = 0.90
Delta = 3 hours Heat Capacity = 3.70 Btu/ft²·lb·°F C-Coefficient = 0.0900 Btu/hr·ft²·°F

90.1-13 Min Floor Nonres Zone 2

90.1-10 App A steel-joist floor, 2.2" LW concrete R-19 insul

Layer	Code	Description	Thickness	Conductivity	Density	Specific Heat	Resistance
1	E0	Inside Surface Resist.					0.69 ft²·hr·°F/Btu
2	M199	90.1-07 Min Floor Zone 1	2.20 in.	0.10 Btu/hr·ft·°F	40.00 lb/cu ft	0.20 Btu/lb·°F	
3	M197	90.1-07 Min insulation R-7.5 ci	2.25 in.	0.02 Btu/hr·ft·°F	2.00 lb/cu ft	0.20 Btu/lb·°F	
4	A0	Outside Surface Resist.					0.33 ft²·hr·°F/Btu

Lamda = 0.87 Weight = 8.50 lb/ft² U-Value = 0.038 Btu/hr·ft²·°F Alpha = 0.90
Delta = 3 hours Heat Capacity = 1.70 Btu/ft²·lb·°F C-Coefficient = 0.0100 Btu/hr·ft²·°F

Floor - Construction Types

4" LW Concrete

4" lightweight concrete

Layer	Code	Description	Thickness	Conductivity	Density	Specific Heat	Resistance
1	E0	Inside Surface Resist.					0.69 ft²·hr·°F/Btu
2	C1	4 in. LW Concrete	4.00 in.	0.10 Btu/hr·ft·°F	40.00 lb/cu ft	0.20 Btu/lb·°F	
3	E0	Inside Surface Resist.					0.69 ft²·hr·°F/Btu

Lamda = 0.89 Weight = 13.33 lb/ft² U-Value = 0.213 Btu/hr·ft²·°F Alpha = 0.90
Delta = 3 hours Heat Capacity = 2.67 Btu/ft²·lb·°F C-Coefficient = 0.0900 Btu/hr·ft²·°F

Library Members

Partitions - Construction Types

0.75" Gyp Frame

0.75" gypsum board frame wall

Layer	Code	Description	Thickness	Conductivity	Density	Specific Heat	Resistance
1	E0	Inside Surface Resist.					0.69 ft²·hr·°F/Btu
2	E1	0.75 in. Plaster	0.75 in.	0.42 Btu/hr·ft·°F	100.00 lb/cu ft	0.20 Btu/lb·°F	
3	B0	Air Space Resistance					0.91 ft²·hr·°F/Btu
4	E1	0.75 in. Plaster	0.75 in.	0.42 Btu/hr·ft·°F	100.00 lb/cu ft	0.20 Btu/lb·°F	
5	E0	Inside Surface Resist.					0.69 ft²·hr·°F/Btu

Lamda = 1.02 Weight = 12.50 lb/ft² U-Value = 0.388 Btu/hr·ft²·°F Alpha = 0.90
Delta = 1 hours Heat Capacity = 2.50 Btu/ft²·lb·°F C-Coefficient = 0.2400 Btu/hr·ft²·°F

Roof - Construction Types

90.1-13 Min Roof Nonres Zor

90.1-10 App A roof with insul above deck, Table A2.2

Layer	Code	Description	Thickness	Conductivity	Density	Specific Heat	Resistance
1	M191	90.1-07 Min int air film					0.68 ft²·hr·°F/Btu
2	M224	90.1-13 Min roof insul zone 2-3	7.20 in.	0.02 Btu/hr·ft·°F	2.00 lb/cu ft	0.20 Btu/lb·°F	
3	M195	90.1-07 Min Roof metal deck	0.00 in.	0.00 Btu/hr·ft·°F	0.00 lb/cu ft	0.00 Btu/lb·°F	
4	M192	90.1-07 Min ext air film					0.17 ft²·hr·°F/Btu

Lamda = 0.98 Weight = 1.20 lb/ft² U-Value = 0.040 Btu/hr·ft²·°F Alpha = 0.45
Delta = 1 hours Heat Capacity = 0.24 Btu/ft²·lb·°F C-Coefficient = 0.0300 Btu/hr·ft²·°F

Wall - Construction Types

90.1-13 Min Wall Nonres Zone 3

90.1-10 App A steel-framed wall, standard framing 3.5" depth

Layer	Code	Description	Thickness	Conductivity	Density	Specific Heat	Resistance
1	M191	90.1-07 Min int air film					0.68 ft²·hr·°F/Btu
2	M194	90.1-07 Min stucco	0.38 in.	0.40 Btu/hr·ft·°F	116.00 lb/cu ft	0.20 Btu/lb·°F	
3	M60	5/8 in. Gypsum Board-horiz	0.63 in.	0.09 Btu/hr·ft·°F	50.00 lb/cu ft	0.26 Btu/lb·°F	
4	M196	90.1-07 Min insulation R-13	3.50 in.	0.05 Btu/hr·ft·°F	2.00 lb/cu ft	0.20 Btu/lb·°F	
5	M220	90.1-13 Min insulation wall zone	1.45 in.	0.03 Btu/hr·ft·°F	2.00 lb/cu ft	0.20 Btu/lb·°F	
6	M60	5/8 in. Gypsum Board-horiz	0.63 in.	0.09 Btu/hr·ft·°F	50.00 lb/cu ft	0.26 Btu/lb·°F	
7	M190	90.1-07 Min Roof int air film					0.61 ft²·hr·°F/Btu

Lamda = 0.97 Weight = 9.75 lb/ft² U-Value = 0.078 Btu/hr·ft²·°F Alpha = 0.90
Delta = 1 hours Heat Capacity = 2.26 Btu/ft²·lb·°F C-Coefficient = 0.0600 Btu/hr·ft²·°F

Library Members

Glass types

90.1-13 Min Swinging Nonres Zone 1-3

Properties based on Std DS Glass

Number of Panes		1		Visible Transmissivity	0.00	Inside Solar Reflectivity	0.35
Shading Coeff	0.00			Inside Visible Reflectivity	0.50	Outside Long Wave Emissivity	0.90
Glass U-Value	0.70		Btu/hr·ft²·°F	Solar Transmissivity	0.00	Inside Long Wave Emissivity	0.90

90.1-2013 Window Zone 4-6 Metal Fixed

Properties based on Std DS Glass

Number of Panes		2		Visible Transmissivity	0.44	Inside Solar Reflectivity	0.15
Shading Coeff	0.46			Inside Visible Reflectivity	0.15	Outside Long Wave Emissivity	0.90
Glass U-Value	0.42		Btu/hr·ft²·°F	Solar Transmissivity	0.90	Inside Long Wave Emissivity	0.90

Single Clear 1/4"

Properties based on Std DS Glass

Number of Panes		1		Visible Transmissivity	0.78	Inside Solar Reflectivity	0.13
Shading Coeff	0.95			Inside Visible Reflectivity	0.14	Outside Long Wave Emissivity	0.84
Glass U-Value	0.95		Btu/hr·ft²·°F	Solar Transmissivity	0.69	Inside Long Wave Emissivity	0.84

Infiltration

Pressurized, Tight Const.

Cooling Design	Heating Design
0.00 air changes/hr	0.00 air changes/hr

Pressurized, Average Const.

Cooling Design	Heating Design
0.30 air changes/hr	0.30 air changes/hr

Neutral, Tight Const.

Cooling Design	Heating Design
0.30 air changes/hr	0.30 air changes/hr

Library Members

Lights

Recessed fluorescent, not vented, 80% load to space

Fixture Type	RECFL-NV	Longwave Radiant Fraction	50 %
Percent Lights to RA	20 %	Shortwave Radiant Fraction	0 %
Ballast Factor	1.00		

LED Lighting 100% load to space

Fixture Type	LED Lighting	Longwave Radiant Fraction	15 %
Percent Lights to RA	0 %	Shortwave Radiant Fraction	55 %
Ballast Factor	1.00		

Recessed fluorescent, not vented, 50% load to space

Fixture Type	RECFL-NV	Longwave Radiant Fraction	50 %
Percent Lights to RA	50 %	Shortwave Radiant Fraction	0 %
Ballast Factor	1.00		

People

Member Name	People Density	Sensible Load	Latent Load	Longwave Radiant Fraction
General Office Space	143.00 ft²/person	250.00 Btuh	200.00 Btuh	70 %

Ventilation

Member Name	People-based Rate (Rp)	Area-based Rate (Ra)
Conference/ meeting	5.0 cfm/person	0.06 cfm/ft²
Member Name	**People-based Rate (Rp)**	Area-based Rate (Ra)
Corridors	0.0 cfm/person	0.06 cfm/ft²
Member Name	**People-based Rate (Rp)**	Area-based Rate (Ra)
Office space	5.0 cfm/person	0.06 cfm/ft²
Member Name	**People-based Rate (Rp)**	Area-based Rate (Ra)
Storage rooms	0.0 cfm/person	0.12 cfm/ft²
Member Name	**People-based Rate (Rp)**	Area-based Rate (Ra)
Lobbies	5.0 cfm/person	0.06 cfm/ft²
Member Name	**People-based Rate (Rp)**	Area-based Rate (Ra)
Break Rooms	5.0 cfm/person	0.06 cfm/ft²

Library Members

Schedules

Off (0%)

Simulation type: Reduced year

		Start time	End time	Status	
January - December	**Cooling design to Sunday**				Equipment operation
		Midnight	Midnight	Off	

Misc - Surgery hospital

Simulation type: Reduced year

		Start time	End time	Percentage	
January - December	**Cooling design to Weekday**				Utilization
		Midnight	7 a.m.	30.0	
		7 a.m.	5 p.m.	100.0	
		5 p.m.	Midnight	30.0	
Heating Design		**Start time**	**End time**	**Percentage**	Utilization
		Midnight	Midnight	0.0	
January - December	**Saturday to Sunday**	**Start time**	**End time**	**Percentage**	Utilization
		Midnight	Midnight	30.0	

90.1-10 NMC on above 80F

Simulation type: Reduced year

		Start time	End time	Percentage	
January - December	**Cooling design to Sunday**				Utilization
		Midnight	Midnight	0.0	
Cooling design		**Start time**	**End time**	**Percentage**	Utilization
		Midnight	Midnight	0.0	

Reset / Lockout

100 % if Room DB > 80.00 F

Library Members

Schedules

People - Low Rise Office

Simulation type: Reduced year

January - December	**Cooling design to Weekday**	**Start time**	**End time**	**Percentage**	Utilization
		Midnight	7 a.m.	0.0	
		7 a.m.	8 a.m.	30.0	
		8 a.m.	11 a.m.	100.0	
		11 a.m.	noon	80.0	
		noon	1 p.m.	40.0	
		1 p.m.	2 p.m.	80.0	
		2 p.m.	5 p.m.	100.0	
		5 p.m.	6 p.m.	30.0	
		6 p.m.	9 p.m.	10.0	
		9 p.m.	Midnight	5.0	
January - December	**Saturday to Sunday**	**Start time**	**End time**	**Percentage**	Utilization
		Midnight	Midnight	0.0	
Heating Design		**Start time**	**End time**	**Percentage**	Utilization
		Midnight	Midnight	0.0	

Library Members

Schedules

Lights - Low rise office

Simulation type: Reduced year

January - December	**Cooling design to Weekday**	**Start time**	**End time**	**Percentage**	Utilization
		Midnight	7 a.m.	5.0	
		7 a.m.	8 a.m.	80.0	
		8 a.m.	10 a.m.	90.0	
		10 a.m.	noon	95.0	
		noon	2 p.m.	80.0	
		2 p.m.	4 p.m.	90.0	
		4 p.m.	5 p.m.	95.0	
		5 p.m.	6 p.m.	80.0	
		6 p.m.	7 p.m.	70.0	
		7 p.m.	8 p.m.	60.0	
		8 p.m.	9 p.m.	40.0	
		9 p.m.	10 p.m.	30.0	
		10 p.m.	Midnight	20.0	
Heating Design		**Start time**	**End time**	**Percentage**	Utilization
		Midnight	Midnight	0.0	
January - December	**Saturday to Sunday**	**Start time**	**End time**	**Percentage**	Utilization
		Midnight	Midnight	5.0	

Library Members

Schedules

Misc - Low rise office

Simulation type: Reduced year

January - December	**Cooling design to Weekday**	**Start time**	**End time**	**Percentage**	Utilization
		Midnight	7 a.m.	5.0	
		7 a.m.	8 a.m.	80.0	
		8 a.m.	10 a.m.	90.0	
		10 a.m.	noon	95.0	
		noon	2 p.m.	80.0	
		2 p.m.	4 p.m.	90.0	
		4 p.m.	5 p.m.	95.0	
		5 p.m.	6 p.m.	80.0	
		6 p.m.	7 p.m.	70.0	
		7 p.m.	8 p.m.	60.0	
		8 p.m.	9 p.m.	40.0	
		9 p.m.	10 p.m.	30.0	
		10 p.m.	Midnight	20.0	
Heating Design		**Start time**	**End time**	**Percentage**	Utilization
		Midnight	Midnight	0.0	
January - December	**Saturday to Sunday**	**Start time**	**End time**	**Percentage**	Utilization
		Midnight	Midnight	5.0	

Available (100%)

Simulation type: Reduced year

January - December	**Cooling design to Sunday**	**Start time**	**End time**	**Percentage**	Utilization
		Midnight	Midnight	100.0	
Heating Design		**Start time**	**End time**	**Percentage**	Utilization
		Midnight	Midnight	100.0	

Library Members

Schedules

Library Members

Cooling Equipment

TRACE® 700 Cooling Equipment Library

Air to Air HP — **Air-cooled unitary - Air to air heat pump**

Comments:

Operating Mode	Capacity		Energy Rate
Cooling		tons	1.220 kW/ton
Heat Recovery	14.40	Mbh/ton	0.090 kW/Mbh
Tank Charging			
Tank Chrg. & Heat Rec.			

Pumps	Type	Full Load Consumption	Pump Head
Chilled water	None	0.000000 kW	
Condenser water	None	0.00000 kW	
Ht Rec or aux cond.	None	kW	
Free cooling pump	None		

Unloading Curves	Primary	Secondary
Power consumed	EQ1288L	AAHP Power Consumed Curve
Ambient modification	EQ1288L - Amb Mod	AAHP Ambient Relief Curve
Capacity		

	Reset Based On	Reset Curve	Max Reset TD
Chilled water	None		
Condenser water	None		

Miscellaneous accessories: Cntl panel & interlocks - 0.1 KW

Load Shed Economizer	No
Evap Precooling	No
Fuel Source	Heating plant
Fuel type	Electric
Free cooling type	None
Fluid cooler type	None
Thermal Storage	None
Tower/condenser	Condenser fan for MZ rooftop

Chilled water temp Design leaving	44.00°F
Chilled water temp Difference	10.00°F
Condenser temp design temp entering	95.00°F
Condenser temp min. operating	40.00°F
Condenser temp Difference	10.00°F
Reject Cond heat to ref	Heat rejection equipment
Reject Cond heat at water temp	105.00°F

Library Members

Cooling Equipment

TRACE® 700 Cooling Equipment Library

90.1-13 Min ACHP AllHeat SS < 65 MBh — **Air-cooled unitary - Air to air heat pump**

Comments: HP, Air-cooled, All heat types, Split System, <65 MBh

Operating Mode	Capacity		Energy Rate	
Cooling		tons	11.800	Packaged EER
Heat Recovery	14.40	Mbh/ton	3.330	Packaged COP
Tank Charging				
Tank Chrg. & Heat Rec.				

Pumps	Type	Full Load Consumption	Pump Head
Chilled water	None	0.000000 kW	
Condenser water	None	0.00000 kW	
Ht Rec or aux cond.	None	kW	
Free cooling pump	None		

Unloading Curves	Primary	Secondary
Power consumed	90.1 min Air to Air HP	90_1 AAHP Power Consumed C
Ambient modification	90.1 Min Air-Air HP	90_1 AAHP Ambient Relief Curv
Capacity		90.1 HP Htg Cap Curve

	Reset Based On	Reset Curve	Max Reset TD
Chilled water	None		
Condenser water	None		

Miscellaneous accessories: Cntl panel & interlocks - 0.1 KW

Load Shed Economizer	No
Evap Precooling	No
Fuel Source	Heating plant
Fuel type	Electric
Free cooling type	None
Fluid cooler type	None
Thermal Storage	None
Tower/condenser	90.1 Min Air Cooled Condenser

Chilled water temp Design leaving	44.00°F
Chilled water temp Difference	12.00°F
Condenser temp design temp entering	95.00°F
Condenser temp min. operating	17.00°F
Condenser temp Difference	0.00°F
Reject Cond heat to ref	Heat rejection equipment
Reject Cond heat at water temp	

Package energy breakout	Primary fan	Secondary fan	Exhaust fan	Optional ventilation fan	Condenser fan
Included in full load energy rate	Yes	No	No	No	Yes

Apply same fans for heat recovery energy breakout: Yes

Library Members

Cooling Equipment

TRACE® 700 Cooling Equipment Library

90.1-13 Min ACHP AllHeat SP < 65 MBh — **Air-cooled unitary - Air to air heat pump**

Comments: HP, Air-cooled, All heat types, Single Package, <65 MBh

Operating Mode	Capacity		Energy Rate	
Cooling		tons	11.800	Packaged EER
Heat Recovery	14.40	Mbh/ton	3.370	Packaged COP
Tank Charging				
Tank Chrg. & Heat Rec.				

Pumps	Type	Full Load Consumption	Pump Head
Chilled water	None	0.000000 kW	
Condenser water	None	0.00000 kW	
Ht Rec or aux cond.	None	kW	
Free cooling pump	None		

Unloading Curves	Primary	Secondary
Power consumed	90.1 min Air to Air HP	90_1 AAHP Power Consumed C
Ambient modification	90.1 Min Air-Air HP	90_1 AAHP Ambient Relief Curv
Capacity		90.1 HP Htg Cap Curve

	Reset Based On	Reset Curve	Max Reset TD
Chilled water	None		
Condenser water	None		

Miscellaneous accessories: Cntl panel & interlocks - 0.1 KW

Load Shed Economizer	No
Evap Precooling	No
Fuel Source	Heating plant
Fuel type	Electric
Free cooling type	None
Fluid cooler type	None
Thermal Storage	None
Tower/condenser	90.1 Min Air Cooled Condenser

Chilled water temp Design leaving	44.00°F
Chilled water temp Difference	12.00°F
Condenser temp design temp entering	95.00°F
Condenser temp min. operating	17.00°F
Condenser temp Difference	0.00°F
Reject Cond heat to ref	Heat rejection equipment
Reject Cond heat at water temp	

Package energy breakout	Primary fan	Secondary fan	Exhaust fan	Optional ventilation fan	Condenser fan
Included in full load energy rate	Yes	No	No	No	Yes

Apply same fans for heat recovery energy breakout: Yes

Library Members

Cooling Equipment

TRACE® 700 Cooling Equipment Library

90.1-13 Min ACHP SS/SP Elec 65-135 MBh — **Air-cooled unitary - Air to air heat pump**

Comments: HP, Air-cooled, Electric heat, SS or SP, 65-135 MBh

Operating Mode	Capacity		Energy Rate
Cooling		tons	11.000 Packaged EER
Heat Recovery	14.40	Mbh/ton	3.300 Packaged COP
Tank Charging			
Tank Chrg. & Heat Rec.			

Pumps	Type	Full Load Consumption	Pump Head
Chilled water	None	0.000000 kW	
Condenser water	None	0.00000 kW	
Ht Rec or aux cond.	None	kW	
Free cooling pump	None		

Unloading Curves	Primary	Secondary
Power consumed	90.1 min Air to Air HP	90_1 AAHP Power Consumed C
Ambient modification	90.1-13 AC HP Elec 65-135 ME	90_1 AAHP Ambient Relief Curv
Capacity		90.1 HP Htg Cap Curve

	Reset Based On	Reset Curve	Max Reset TD
Chilled water	None		
Condenser water	None		

Miscellaneous accessories: Cntl panel & interlocks - 0.1 KW

Load Shed Economizer	No
Evap Precooling	No
Fuel Source	Heating plant
Fuel type	Electric
Free cooling type	None
Fluid cooler type	None
Thermal Storage	None
Tower/condenser	90.1 Min Air Cooled Condenser

Chilled water temp Design leaving	44.00°F
Chilled water temp Difference	12.00°F
Condenser temp design temp entering	95.00°F
Condenser temp min. operating	17.00°F
Condenser temp Difference	0.00°F
Reject Cond heat to ref	Heat rejection equipment
Reject Cond heat at water temp	

Package energy breakout	Primary fan	Secondary fan	Exhaust fan	Optional ventilation fan	Condenser fan
Included in full load energy rate	Yes	No	No	No	Yes

Apply same fans for heat recovery energy breakout: Yes

Library Members

Cooling Equipment

TRACE® 700 Cooling Equipment Library

VRV IV Daikin AC Heat Recovery — **Air-cooled unitary - Air to air heat pump**

Comments: based on DAIKIN VRV IV air-cooled Heat Recovery REYQ series

Operating Mode	Capacity		Energy Rate
Cooling		tons	3.730 Packaged COP
Heat Recovery	13.50	Mbh/ton	3.960 Packaged COP
Tank Charging		tons	kW/ton
Tank Chrg. & Heat Rec.		tons	kW/ton

Pumps	Type	Full Load Consumption	Pump Head
Chilled water	None	0.000000 kW	
Condenser water	None	0.00000 kW	
Ht Rec or aux cond.	None	kW	
Free cooling pump	None		

Unloading Curves	Primary	Secondary
Power consumed	VRV IV Daikin AC HR Cooling F	VRV IV Daikin AC HR Heating F
Ambient modification	VRV IV Daikin AC HR Cooling E	VRV IV Daikin AC HR Heating E
Capacity	VRV IV Daikin AC HR Cooling C	VRV IV Daikin AC HR Heating C

	Reset Based On	Reset Curve	Max Reset TD
Chilled water	None		
Condenser water	None		

Miscellaneous accessories: Heat pump defrost cycle

Load Shed Economizer	No
Evap Precooling	No
Fuel Source	Utility
Fuel type	Electric
Free cooling type	None
Fluid cooler type	None
Thermal Storage	None
Tower/condenser	Included In Compressor Power

Chilled water temp Design leaving	44.00°F
Chilled water temp Difference	12.00°F
Condenser temp design temp entering	95.00°F
Condenser temp min. operating	0.00°F
Condenser temp Difference	0.00°F
Reject Cond heat to ref	Heating plant
Reject Cond heat at water temp	

Package energy breakout	Primary fan	Secondary fan	Exhaust fan	Optional ventilation fan	Condenser fan
Included in full load energy rate	Yes	No	No	No	Yes

Apply same fans for heat recovery energy breakout: No

Library Members

Cooling Equipment

TRACE® 700 Cooling Equipment Library

90.1-13 Min AC SS AllHeat <65 MBh — **Air-cooled unitary - Direct expansion (DX)**

Comments: AC, Air Cooled, All heating Type, Split System, <65 MBh

Operating Mode	Capacity	Energy Rate
Cooling	tons	11.100 Packaged EER
Heat Recovery	tons	kW/ton
Tank Charging	tons	kW/ton
Tank Chrg. & Heat Rec.	tons	kW/ton

Pumps	Type	Full Load Consumption	Pump Head
Chilled water	None	0.000000 kW	
Condenser water	None	0.00000 kW	
Ht Rec or aux cond.	None	kW	
Free cooling pump	None		

Unloading Curves	Primary	Secondary
Power consumed	90.1 Min SS and SP	90.1 Min SS and SP
Ambient modification	90.1 Min SS-SP Amb mod	None
Capacity		

	Reset Based On	Reset Curve	Max Reset TD
Chilled water	None		
Condenser water	None		

Miscellaneous accessories

Cntl panel & interlocks - 0.05 KW

Load Shed Economizer	No
Evap Precooling	No
Fuel Source	Utility
Fuel type	Electric
Free cooling type	None
Fluid cooler type	None
Thermal Storage	None
Tower/condenser	90.1 Min Air Cooled Condenser

Chilled water temp Design leaving	44.00°F
Chilled water temp Difference	12.00°F
Condenser temp design temp entering	95.00°F
Condenser temp min. operating	55.00°F
Condenser temp Difference	0.00°F
Reject Cond heat to ref	Heat rejection equipment
Reject Cond heat at water temp	

Package energy breakout	Primary fan	Secondary fan	Exhaust fan	Optional ventilation fan	Condenser fan
Included in full load energy rate	Yes	No	No	No	Yes

Apply same fans for heat recovery energy breakout: No

Library Members

Fans

FC Centrifugal const vol

Fan type	Constant volume
Comments	Forward curved Centrifugal fan constant volume
Full load energy	0.00032 kW/Cfm-in wg
Unloading curve	Fan Curve Straight Line

FC Centrifugal const vol

Fan type	Constant volume
Comments	Forward curved Centrifugal fan constant volume
Full load energy	0.00032 kW/Cfm-in wg
Unloading curve	Fan Curve Straight Line

Fan coil supply fan

Fan type	Constant volume
Comments	Fan coil supply fan
Full load energy	0.00024 kW/Cfm
Unloading curve	Fan Curve On/Off

AF Centrifugal var freq drv

Fan type	Variable volume
Comments	Air foil Centrifugal with variable frequency drive
Full load energy	0.00022 kW/Cfm-in wg
Unloading curve	Fan Curve 9

BI Centrifugal var spd mtr

Fan type	Variable volume
Comments	Backward inclined Centrifugal with variable speed moto
Full load energy	0.00027 kW/Cfm-in wg
Unloading curve	Fan Curve 9

BI Centrifugal const vol

Fan type	Constant volume
Comments	Backward inclined Centrifugal fan constant volume
Full load energy	0.00024 kW/Cfm-in wg
Unloading curve	Fan Curve Straight Line

Library Members

Heating Equipment

Default electric resistance

Comments	ROOFTOP ELECTRIC HEAT	
Category	Electric resistance	
Heat Source	Utility	
Fuel Type	Electric	
Capacity		Mbh
Energy Rate	100.000	Percent efficient
Hot Water Pump	None	
Hot Water Pump Full Load	0.00	kW
Hot Water Leaving temp		°F
Storage tank	None	
Unloading Curve	Htg Straight Line	

Miscellaneous Accessories

Library Members

Heat Rejection

90.1 Min Air Cooled Condenser

Comments	For Air-cooled Centrifugal	
Capacity	100.00	Percent
Energy consumption	0.06	kW/ton
Low speed consumpt	14.30	Percent full load
Fluid type	Water	
Condenser type	Air-cooled condenser	
Number of cells	1	
% Air at low Speed	50.00	
Approach Temp	10.00	°F
Temp Range	10.00	°F
Wet bulb Temp	78.00	°F
Design water flow rate	3.00	gpm/ton
Makeup water flow rate	0.00	gal/ton-hr
Hourly Amb WB Offset		°F
Unloading curve	Cooling Tower with 2-Speed Fan	

Coil load assignmen

+ Main
Direct evaporator
+ Indirect evaporator
+ Auxiliary
+ Optional ventilation
+ Misc cooling load

Included In Compressor Power

Comments	Energy Included in Comp Full Load Data	
Capacity	100.00	Percent
Energy consumption	0.00	kW/ton
Low speed consumpt		kW/ton
Fluid type	Refrigerant (Air-cooled)	
Condenser type	Air-cooled condenser	
Number of cells	1	
% Air at low Speed		
Approach Temp	10.00	°F
Temp Range	10.00	°F
Wet bulb Temp	78.00	°F
Design water flow rate	0.00	gpm/ton
Makeup water flow rate	0.00	gal/ton-hr
Hourly Amb WB Offset		°F
Unloading curve	C-Tower on/off	

Coil load assignmen

+ Main
Direct evaporator
+ Indirect evaporator
+ Auxiliary
+ Optional ventilation
+ Misc cooling load

Library Members

Heat Rejection

Condenser fan for MZ rooftop

Comments	Multizone packaged rooftop cond fan	
Capacity	100.00	Percent
Energy consumption	0.08	kW/ton
Low speed consumpt	0.00	Percent full load
Fluid type	Water	
Condenser type	Air-cooled condenser	
Number of cells	1	
% Air at low Speed	0.00	
Approach Temp	5.56	°C
Temp Range	5.56	°C
Wet bulb Temp	25.56	°C
Design water flow rate	3.00	gpm/ton
Makeup water flow rate	0.00	gal/ton-hr
Hourly Amb WB Offset		°C
Unloading curve	C-Tower on/off	

Coil load assignmen

+ Main
  Direct evaporator
+ Indirect evaporator
+ Auxiliary
+ Optional ventilation
+ Misc cooling load

Heat Recovery

ENTERED VALUES

Walls by Cardinal Direction

By HDR

Alternative 1

* Building Orientation can be found on the Load Parameters screen.

East Facing

Room Description	Wall Description	Area	Dir	Tilt	Const Type	U Value Btu/h·ft²·°F	Alpha	Glass Type	Glass Area ft²	Glass SHGC	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading
112 OPEN OFFICE	SOUTH	483.0	135	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	WINDOW				Window			90.1-2013 Window Z	36.0	0.40	0.4200	Overhang - None	None
HALLWAY	SOUTH	72.0	135	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	DOOR WINDOW				Window			90.1-2013 Window Z	10.0	0.40	0.4200	Overhang - None	None
	DOOR				Door			90.1-13 Min Swinging	16.3	0.00	0.3700	Overhang - None	None
116 SR TRAFFIC OFFICE	SOUTH	171.0	135	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	WINDOW				Window			90.1-2013 Window Z	12.0	0.40	0.4200	Overhang - None	None
117 SR TRAFFIC OFFICE	SOUTH	186.0	135	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	WINDOW				Window			90.1-2013 Window Z	12.0	0.40	0.4200	Overhang - None	None
ATTIC	SOUTH	76.0	135	0	90.1-13 Min Wall Nonres	0.0890	0.90						
		988.0				**0.0890**			**70.0**	**0.32**	**0.4100**		

ENTERED VALUES

Walls by Cardinal Direction

By HDR

North Facing

Room Description	Wall Description	Area	Dir	Tilt	Const Type	U Value Btu/h·ft²·°F	Alpha	Glass Type	Glass Area ft²	Glass SHGC	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading
100 VESTIBULE	EAST	92.4	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
112 OPEN OFFICE	EAST	60.0	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
HALLWAY	EAST	284.4	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
117 SR TRAFFIC OFFICE	EAST	150.0	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	WINDOW				Window			90.1-2013 Window Z	12.0	0.40	0.4200	Overhang - None	None
118 FILE ROOM	EAST	104.4	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
119 COMM	EAST	126.0	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
120 MECH/ELEC ROOM	EAST	204.0	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	DOOR				Door			90.1-13 Min Swinging	21.0	0.00	0.3700	Overhang - None	None
ATTIC	EAST- SMALL	24.0	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
ATTIC	EAST - LARGE	239.4	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
		1,284.6				**0.0890**			**12.0**	**0.20**	**0.3950**		

ENTERED VALUES

Walls by Cardinal Direction

By HDR

South Facing

Room Description	Wall Description	Area	Dir	Tilt	Const Type	U Value Btu/h·ft²·°F	Alpha	Glass Type	Glass Area ft²	Glass SHGC	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading
100 VESTIBULE	WEST	92.4	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
101 LOBBY	WEST	288.0	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	WINDOW				Window			90.1-2013 Window Z	24.0	0.40	0.4200	Overhang - None	None
109 VESTIBULE	WEST	156.0	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	DOOR				Door			90.1-13 Min Swinging	25.5	0.00	0.3700	Overhang - None	None
	DOOR WINDOW				Window			90.1-2013 Window Z	20.0	0.40	0.4200	Overhang - None	None
110 MMT CARRIER	WEST	219.6	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
112 OPEN OFFICE	WEST	210.0	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
116 SR TRAFFIC OFFICE	WEST	60.0	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
ATTIC	WEST - LARGE	372.4	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
ATTIC	WEST - SMALL	24.0	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
		1,422.4				**0.0890**			**44.0**	**0.26**	**0.4033**		

ENTERED VALUES

Walls by Cardinal Direction

By HDR

West Facing

Room Description	Wall Description	Area	Dir	Tilt	Const Type	U Value Btu/h·ft²·°F	Alpha	Glass Type	Glass Area ft²	Glass SHGC	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading
100 VESTIBULE	NORTH	144.0	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	DOOR WINDOW				Window			90.1-2013 Window Z	20.0	0.40	0.4200	Overhang - None	None
	DOOR				Door			90.1-13 Min Swinging	25.5	0.00	0.3700	Overhang - None	None
101 LOBBY	NORTH	174.0	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	WINDOW				Window			90.1-2013 Window Z	12.0	0.40	0.4200	Overhang - None	None
102 WOMENS RR	NORTH	102.0	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
104 WOMENS RR	NORTH	104.4	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
109 VESTIBULE	NORTH	114.0	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
HALLWAY	NORTH	138.0	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	DOOR				Door			90.1-13 Min Swinging	16.3	0.00	0.3700	Overhang - None	None
	DOOR WINDOW				Window			90.1-2013 Window Z	10.0	0.40	0.4200	Overhang - None	None
120 MECH/ELEC ROOM	NORTH	114.0	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
ATTIC	NORTH - LARGE	392.2	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
ATTIC	NORTH - SMALL	24.5	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
		1,307.1				**0.0890**			**42.0**	**0.24**	**0.4000**		
Total Area		**5,002**							**168**				

Note: 1. The areas include the floor multiplier and the room multiplier.

2. Door areas are not included in the glass area totals.

ENTERED VALUES

Walls by Cardinal Direction

By HDR

Alternative 2

* Building Orientation can be found on the Load Parameters screen.

East Facing

Room Description	Wall Description	Area	Dir	Tilt	Const Type	U Value Btu/h·ft²·°F	Alpha	Glass Type	Glass Area ft²	Glass SHGC	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading
112 OPEN OFFICE	SOUTH	483.0	135	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	WINDOW				Window			90.1-2013 Window Z	36.0	0.24	0.4200	Overhang - None	None
HALLWAY	SOUTH	72.0	135	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	DOOR WINDOW				Window			90.1-2013 Window Z	10.0	0.24	0.4200	Overhang - None	None
	DOOR				Door			90.1-13 Min Swinging	16.3	0.00	0.3700	Overhang - None	None
116 SR TRAFFIC OFFICE	SOUTH	171.0	135	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	WINDOW				Window			90.1-2013 Window Z	12.0	0.24	0.4200	Overhang - None	None
117 SR TRAFFIC OFFICE	SOUTH	186.0	135	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	WINDOW				Window			90.1-2013 Window Z	12.0	0.24	0.4200	Overhang - None	None
ATTIC	SOUTH	76.0	135	0	90.1-13 Min Wall Nonres	0.0890	0.90						
		988.0				**0.0890**			**70.0**	**0.19**	**0.4100**		

ENTERED VALUES

Walls by Cardinal Direction

By HDR

North Facing

Room Description	Wall Description	Area	Dir	Tilt	Const Type	U Value Btu/h·ft²·°F	Alpha	Glass Type	Glass Area ft²	Glass SHGC	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading
100 VESTIBULE	EAST	92.4	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
112 OPEN OFFICE	EAST	60.0	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
HALLWAY	EAST	284.4	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
117 SR TRAFFIC OFFICE	EAST	150.0	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	WINDOW				Window			90.1-2013 Window Z	12.0	0.24	0.4200	Overhang - None	None
118 FILE ROOM	EAST	104.4	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
119 COMM	EAST	126.0	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
120 MECH/ELEC ROOM	EAST	204.0	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	DOOR				Door			90.1-13 Min Swinging	21.0	0.00	0.3700	Overhang - None	None
ATTIC	EAST- SMALL	24.0	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
ATTIC	EAST - LARGE	239.4	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
		1,284.6				**0.0890**			**12.0**	**0.12**	**0.3950**		

ENTERED VALUES

Walls by Cardinal Direction

By HDR

South Facing

Room Description	Wall Description	Area	Dir	Tilt	Const Type	U Value Btu/h·ft²·°F	Alpha	Glass Type	Glass Area ft²	Glass SHGC	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading
100 VESTIBULE	WEST	92.4	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
101 LOBBY	WEST	288.0	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	WINDOW				Window			90.1-2013 Window Z	24.0	0.24	0.4200	Overhang - None	None
109 VESTIBULE	WEST	156.0	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	DOOR				Door			90.1-13 Min Swinging	25.5	0.00	0.3700	Overhang - None	None
	DOOR WINDOW				Window			90.1-2013 Window Z	20.0	0.24	0.4200	Overhang - None	None
110 MMT CARRIER	WEST	219.6	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
112 OPEN OFFICE	WEST	210.0	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
116 SR TRAFFIC OFFICE	WEST	60.0	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
ATTIC	WEST - LARGE	372.4	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
ATTIC	WEST - SMALL	24.0	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
		1,422.4				**0.0890**			**44.0**	**0.16**	**0.4033**		

ENTERED VALUES

Walls by Cardinal Direction

By HDR

West Facing

Room Description	Wall Description	Area	Dir	Tilt	Const Type	U Value Btu/h·ft²·°F	Alpha	Glass Type	Glass Area ft²	Glass SHGC	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading
100 VESTIBULE	NORTH	144.0	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	DOOR WINDOW				Window			90.1-2013 Window Z	20.0	0.24	0.4200	Overhang - None	None
	DOOR				Door			90.1-13 Min Swinging	25.5	0.00	0.3700	Overhang - None	None
101 LOBBY	NORTH	174.0	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	WINDOW				Window			90.1-2013 Window Z	12.0	0.24	0.4200	Overhang - None	None
102 WOMENS RR	NORTH	102.0	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
104 WOMENS RR	NORTH	104.4	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
109 VESTIBULE	NORTH	114.0	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
HALLWAY	NORTH	138.0	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	DOOR				Door			90.1-13 Min Swinging	16.3	0.00	0.3700	Overhang - None	None
	DOOR WINDOW				Window			90.1-2013 Window Z	10.0	0.24	0.4200	Overhang - None	None
120 MECH/ELEC ROOM	NORTH	114.0	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
ATTIC	NORTH - LARGE	392.2	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
ATTIC	NORTH - SMALL	24.5	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
		1,307.1				**0.0890**			**42.0**	**0.14**	**0.4000**		
Total Area		**5,002**							**168**				

Note: 1. The areas include the floor multiplier and the room multiplier.

2. Door areas are not included in the glass area totals.

ENTERED VALUES

Walls by Cardinal Direction

By HDR

Alternative 3

* Building Orientation can be found on the Load Parameters screen.

East Facing

Room Description	Wall Description	Area	Dir	Tilt	Const Type	U Value Btu/h·ft²·°F	Alpha	Glass Type	Glass Area ft²	Glass SHGC	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading
112 OPEN OFFICE	SOUTH	483.0	135	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	WINDOW				Window			90.1-2013 Window Z	36.0	0.24	0.4200	Overhang - None	None
HALLWAY	SOUTH	72.0	135	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	DOOR WINDOW				Window			90.1-2013 Window Z	10.0	0.24	0.4200	Overhang - None	None
	DOOR				Door			90.1-13 Min Swinging	16.3	0.00	0.3700	Overhang - None	None
116 SR TRAFFIC OFFICE	SOUTH	171.0	135	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	WINDOW				Window			90.1-2013 Window Z	12.0	0.24	0.4200	Overhang - None	None
117 SR TRAFFIC OFFICE	SOUTH	186.0	135	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	WINDOW				Window			90.1-2013 Window Z	12.0	0.24	0.4200	Overhang - None	None
ATTIC	SOUTH	76.0	135	0	90.1-13 Min Wall Nonres	0.0890	0.90						
		988.0				**0.0890**			**70.0**	**0.19**	**0.4100**		

ENTERED VALUES

Walls by Cardinal Direction

By HDR

North Facing

Room Description	Wall Description	Area	Dir	Tilt	Const Type	U Value Btu/h·ft²·°F	Alpha	Glass Type	Glass Area ft²	Glass SHGC	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading
100 VESTIBULE	EAST	92.4	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
112 OPEN OFFICE	EAST	60.0	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
HALLWAY	EAST	284.4	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
117 SR TRAFFIC OFFICE	EAST	150.0	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	WINDOW				Window			90.1-2013 Window Z	12.0	0.24	0.4200	Overhang - None	None
118 FILE ROOM	EAST	104.4	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
119 COMM	EAST	126.0	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
120 MECH/ELEC ROOM	EAST	204.0	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	DOOR				Door			90.1-13 Min Swinging	21.0	0.00	0.3700	Overhang - None	None
ATTIC	EAST- SMALL	24.0	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
ATTIC	EAST - LARGE	239.4	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
		1,284.6				**0.0890**			**12.0**	**0.12**	**0.3950**		

ENTERED VALUES

Walls by Cardinal Direction

By HDR

South Facing

Room Description	Wall Description	Area	Dir	Tilt	Const Type	U Value Btu/h·ft²·°F	Alpha	Glass Type	Glass Area ft²	Glass SHGC	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading
100 VESTIBULE	WEST	92.4	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
101 LOBBY	WEST	288.0	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	WINDOW				Window			90.1-2013 Window Z	24.0	0.24	0.4200	Overhang - None	None
109 VESTIBULE	WEST	156.0	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	DOOR				Door			90.1-13 Min Swinging	25.5	0.00	0.3700	Overhang - None	None
	DOOR WINDOW				Window			90.1-2013 Window Z	20.0	0.24	0.4200	Overhang - None	None
110 MMT CARRIER	WEST	219.6	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
112 OPEN OFFICE	WEST	210.0	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
116 SR TRAFFIC OFFICE	WEST	60.0	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
ATTIC	WEST - LARGE	372.4	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
ATTIC	WEST - SMALL	24.0	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
		1,422.4				**0.0890**			**44.0**	**0.16**	**0.4033**		

ENTERED VALUES

Walls by Cardinal Direction

By HDR

West Facing

Room Description	Wall Description	Area	Dir	Tilt	Const Type	U Value Btu/h·ft²·°F	Alpha	Glass Type	Glass Area ft²	Glass SHGC	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading
100 VESTIBULE	NORTH	144.0	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	DOOR WINDOW				Window			90.1-2013 Window Z	20.0	0.24	0.4200	Overhang - None	None
	DOOR				Door			90.1-13 Min Swinging	25.5	0.00	0.3700	Overhang - None	None
101 LOBBY	NORTH	174.0	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	WINDOW				Window			90.1-2013 Window Z	12.0	0.24	0.4200	Overhang - None	None
102 WOMENS RR	NORTH	102.0	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
104 WOMENS RR	NORTH	104.4	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
109 VESTIBULE	NORTH	114.0	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
HALLWAY	NORTH	138.0	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	DOOR				Door			90.1-13 Min Swinging	16.3	0.00	0.3700	Overhang - None	None
	DOOR WINDOW				Window			90.1-2013 Window Z	10.0	0.24	0.4200	Overhang - None	None
120 MECH/ELEC ROOM	NORTH	114.0	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
ATTIC	NORTH - LARGE	392.2	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
ATTIC	NORTH - SMALL	24.5	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
		1,307.1				**0.0890**			**42.0**	**0.14**	**0.4000**		
Total Area		**5,002**							**168**				

Note: 1. The areas include the floor multiplier and the room multiplier.

2. Door areas are not included in the glass area totals.

ENTERED VALUES

Walls by Cardinal Direction

By HDR

Alternative 4

* Building Orientation can be found on the Load Parameters screen.

East Facing

Room Description	Wall Description	Area	Dir	Tilt	Const Type	U Value Btu/h·ft²·°F	Alpha	Glass Type	Glass Area ft²	Glass SHGC	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading
112 OPEN OFFICE	SOUTH	483.0	135	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	WINDOW				Window			90.1-2013 Window Z	36.0	0.24	0.4200	Overhang - None	None
HALLWAY	SOUTH	72.0	135	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	DOOR WINDOW				Window			90.1-2013 Window Z	10.0	0.24	0.4200	Overhang - None	None
	DOOR				Door			90.1-13 Min Swinging	16.3	0.00	0.3700	Overhang - None	None
116 SR TRAFFIC OFFICE	SOUTH	171.0	135	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	WINDOW				Window			90.1-2013 Window Z	12.0	0.24	0.4200	Overhang - None	None
117 SR TRAFFIC OFFICE	SOUTH	186.0	135	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	WINDOW				Window			90.1-2013 Window Z	12.0	0.24	0.4200	Overhang - None	None
ATTIC	SOUTH	76.0	135	0	90.1-13 Min Wall Nonres	0.0890	0.90						
		988.0				**0.0890**			**70.0**	**0.19**	**0.4100**		

ENTERED VALUES

Walls by Cardinal Direction

By HDR

North Facing

Room Description	Wall Description	Area	Dir	Tilt	Const Type	U Value Btu/h·ft²·°F	Alpha	Glass Type	Glass Area ft²	Glass SHGC	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading
100 VESTIBULE	EAST	92.4	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
112 OPEN OFFICE	EAST	60.0	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
HALLWAY	EAST	284.4	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
117 SR TRAFFIC OFFICE	EAST	150.0	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	WINDOW				Window			90.1-2013 Window Z	12.0	0.24	0.4200	Overhang - None	None
118 FILE ROOM	EAST	104.4	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
119 COMM	EAST	126.0	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
120 MECH/ELEC ROOM	EAST	204.0	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	DOOR				Door			90.1-13 Min Swinging	21.0	0.00	0.3700	Overhang - None	None
ATTIC	EAST- SMALL	24.0	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
ATTIC	EAST - LARGE	239.4	45	0	90.1-13 Min Wall Nonres	0.0890	0.90						
		1,284.6				**0.0890**			**12.0**	**0.12**	**0.3950**		

ENTERED VALUES

Walls by Cardinal Direction

By HDR

South Facing

Room Description	Wall Description	Area	Dir	Tilt	Const Type	U Value Btu/h·ft²·°F	Alpha	Glass Type	Glass Area ft²	Glass SHGC	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading
100 VESTIBULE	WEST	92.4	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
101 LOBBY	WEST	288.0	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	WINDOW				Window			90.1-2013 Window Z	24.0	0.24	0.4200	Overhang - None	None
109 VESTIBULE	WEST	156.0	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	DOOR				Door			90.1-13 Min Swinging	25.5	0.00	0.3700	Overhang - None	None
	DOOR WINDOW				Window			90.1-2013 Window Z	20.0	0.24	0.4200	Overhang - None	None
110 MMT CARRIER	WEST	219.6	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
112 OPEN OFFICE	WEST	210.0	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
116 SR TRAFFIC OFFICE	WEST	60.0	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
ATTIC	WEST - LARGE	372.4	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
ATTIC	WEST - SMALL	24.0	225	0	90.1-13 Min Wall Nonres	0.0890	0.90						
		1,422.4				**0.0890**			**44.0**	**0.16**	**0.4033**		

ENTERED VALUES

Walls by Cardinal Direction

By HDR

West Facing

Room Description	Wall Description	Area	Dir	Tilt	Const Type	U Value Btu/h·ft²·°F	Alpha	Glass Type	Glass Area ft²	Glass SHGC	Glass U Value Btu/h·ft²·°F	Glass External Shading	Glass Internal Shading
100 VESTIBULE	NORTH	144.0	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	DOOR WINDOW				Window			90.1-2013 Window Z	20.0	0.24	0.4200	Overhang - None	None
	DOOR				Door			90.1-13 Min Swinging	25.5	0.00	0.3700	Overhang - None	None
101 LOBBY	NORTH	174.0	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	WINDOW				Window			90.1-2013 Window Z	12.0	0.24	0.4200	Overhang - None	None
102 WOMENS RR	NORTH	102.0	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
104 WOMENS RR	NORTH	104.4	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
109 VESTIBULE	NORTH	114.0	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
HALLWAY	NORTH	138.0	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
	DOOR				Door			90.1-13 Min Swinging	16.3	0.00	0.3700	Overhang - None	None
	DOOR WINDOW				Window			90.1-2013 Window Z	10.0	0.24	0.4200	Overhang - None	None
120 MECH/ELEC ROOM	NORTH	114.0	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
ATTIC	NORTH - LARGE	392.2	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
ATTIC	NORTH - SMALL	24.5	315	0	90.1-13 Min Wall Nonres	0.0890	0.90						
		1,307.1				**0.0890**			**42.0**	**0.14**	**0.4000**		
Total Area		**5,002**							**168**				

Note: 1. The areas include the floor multiplier and the room multiplier.

2. Door areas are not included in the glass area totals.

Appendix B

HVAC Comparison Energy Model Results

September 6, 2024

PBA ACP - VCC

Location	**White Hall, Arkansas**
Building owner	**US Army**
Program user	**Cody Haby**
Company	**HDR**
Comments	

By	**HDR**
Dataset name	**C:\USERS\CHABY\ONEDRIVE - HDR, INC\PROJECTS\PINE BLUFF\TRACE\PINE BLUFFII.TRC**

Calculation time	**10:27 PM on 09/09/2024**
TRACE® 700 version	**6.3.4**

Location	**Grider Field, Arkansas**	
Latitude	**34.2**	**deg**
Longitude	**91.9**	**deg**
Time Zone	**6**	
Elevation	**207**	**ft**
Barometric pressure	**29.6**	**in. Hg**
Air density	**0.0753**	**lb/cu ft**
Air specific heat	**0.2444**	**Btu/lb·°F**
Density-specific heat product	**1.1045**	**Btu/h·cfm·°F**
Latent heat factor	**4,861.9**	**Btu·min/h·cu ft**
Enthalpy factor	**4.5185**	**lb·min/hr·cu ft**
Summer design dry bulb	**94.9**	**°F**
Summer design wet bulb	**77.3**	**°F**
Winter design dry bulb	**25.2**	**°F**
Summer clearness number	**0.95**	
Winter clearness number	**0.95**	
Summer ground reflectance	**0.20**	
Winter ground reflectance	**0.20**	
Carbon Dioxide Level	**400**	**ppm**

Design simulation period	**January - December**
Cooling load methodology	**TETD-TA1**
Heating load methodology	**UATD**

Energy Cost Budget / PRM Summary

By HDR

Project Name: PBA ACP - VCC	Date: September 10, 2024
City: White Hall, Arkansas	Weather Data: Grider Field, Arkansas

Note: The percentage displayed for the "Proposed/ Base %" column of the base case is actually the percentage of the total energy consumption.

* Denotes the base alternative for the ECB study.

		* Alt-4 ASHRAE BASELINE: RTU			Alt-1 DX splits with DOAS and E			Alt-2 VRF with DOAS and ERU			Alt-3 DX VAV AHU		
		Energy 10^6 Btu/yr	Proposed / Base %	Peak kBtuh	Energy 10^6 Btu/yr	Proposed / Base %	Peak kBtuh	Energy 10^6 Btu/yr	Proposed / Base %	Peak kBtuh	Energy 10^6 Btu/yr	Proposed / Base %	Peak kBtuh
Lighting - Conditioned	Electricity	44.6	18	13	44.6	100	13	44.6	100	13	44.6	100	13
Space Heating	Electricity	19.3	8	77	12.7	66	20	12.0	62	19	12.5	65	42
Space Cooling	Electricity	63.4	26	47	67.1	106	44	39.1	62	32	34.8	55	21
Heat Rejection	Electricity	3.4	1	5	5.4	156	3	2.8	81	2	4.8	140	3
Fans - Conditioned	Electricity	47.0	19	12	29.5	63	8	20.3	43	7	17.5	37	9
Receptacles - Conditioned	Electricity	69.6	28	19	69.6	100	19	69.6	100	19	69.6	100	19
Total Building Consumption		**247.3**			**228.9**			**188.3**			**183.9**		

		* Alt-4 ASHRAE BASELINE: RTU	Alt-1 DX splits with DOAS and E	Alt-2 VRF with DOAS and ERU	Alt-3 DX VAV AHU
Total	**Number of hours heating load not met**	193	177	190	193
	Number of hours cooling load not met	58	0	0	0

	* Alt-4 ASHRAE BASELINE: RTU		Alt-1 DX splits with DOAS and E		Alt-2 VRF with DOAS and ERU		Alt-3 DX VAV AHU	
	Energy 10^6 Btu/yr	Cost/yr $/yr	Energy 10^6 Btu/yr	Cost/yr $/yr	Energy 10^6 Btu/yr	Cost/yr $/yr	Energy 10^6 Btu/yr	Cost/yr $/yr
Electricity	247.3	0	228.9	0	188.3	0	183.9	0
Total	**247**	**0**	**229**	**0**	**188**	**0**	**184**	**0**

System Checksums

By HDR

HEAT PUMPS — **Incremental Heat Pump**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 17
Outside Air: OADB/WB/HR: 94 / 75 / 105

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	9,994	9,994	11
Glass Solar	9,235	0	9,235	10
Glass/Door Cond	733	0	733	1
Wall Cond	25,055	5,693	30,748	34
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	1,182.33	241.28	1,423.61	1.57
Infiltration	3,030		3,030	3
Sub Total ==>	39,236	15,928	55,164	61
Internal Loads				
Lights	5,694	5,694	11,387	13
People	18,337	0	18,337	20
Misc	12,317	0	12,317	14
Sub Total ==>	36,348	5,694	42,041	46
Ceiling Load	16,603	-16,603	0	0
Ventilation Load	-7,574	0	-7,574	-8
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			1,181	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	84,612	5,019	90,812	100.00

CLG SPACE PEAK

Mo/Hr: Sum of
OADB: Peaks

	Space Sensible Btu/h	Percent Of Total (%)
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	9,240	11
Glass/Door Cond	685	1
Wall Cond	26,628	33
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	960.46	1.18
Infiltration	1,259	2
Sub Total ==>	38,773	48
Lights	5,715	7
People	10,160	13
Misc	12,322	15
Sub Total ==>	28,198	35
	16,949	21
	-2,850	-4
	0	0
	0	0
Grand Total ==>	81,070	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-4,019	10.52
Glass Solar	0	0	0.00
Glass/Door Cond	-2,768	-2,768	7.24
Wall Cond	-9,918	-11,607	30.37
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	9,001.88	1,130.05	-2.96
Infiltration	-3,138	-3,138	8.21
Sub Total ==>	-6,822	-20,402	53.38
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-13,580	0	0.00
Ventilation Load	2,408	2,408	-6.30
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-20,226	52.92
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-17,994	-38,220	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.1	75.8
Ra Plenum	85.4	51.6
Return	74.1	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	3,985	3,985
Terminal	3,985	3,985
Main Fan	3,985	3,985
Sec Fan	0	0
Nom Vent	1,090	1,090
AHU Vent	1,090	1,090
Infil	66	66
MinStop/Rh	0	0
Return	5,141	5,141
Exhaust	1,156	1,156
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	27.4	27.4
cfm/ft²	0.43	0.43
cfm/ton	309.39	
ft²/ton	714.59	
Btu/hr·ft²	16.79	-6.60
No. People	41	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	6.0	71.9	66.7	3,985	74.4	61.9	63.6	58.1	55.8	63.5
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	6.9	82.6	39.0	1,090	82.4	73.3	110.6	50.0	49.9	53.9
Total	12.9	154.5								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	9,203		
Part	0		
Int Door	0		
ExFlr	4,723		
Roof	4,745	0	0
Wall	3,927	128	3
Ext Door	33	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-34.3	3,985	68.0	75.8
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-26.5	1,090	50.0	72.0
Total	-60.8			

System Checksums

By HDR

SS-1 **Incremental Heat Pump**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 17
Outside Air: OADB/WB/HR: 94 / 75 / 105

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	393	0	393	13
Glass Solar	0	0	0	0
Glass/Door Cond	115	0	115	4
Wall Cond	1,546	0	1,546	50
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	550		550	18
Sub Total ==>	2,603	0	2,603	85
Internal Loads				
Lights	459	0	459	15
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	459	0	459	15
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			9	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	3,062	0	3,071	100.00

CLG SPACE PEAK

Mo/Hr: Sum of
OADB: Peaks

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	393	14
Glass Solar	0	0
Glass/Door Cond	115	4
Wall Cond	1,546	56
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	244	9
Sub Total ==>	2,298	83
Internal Loads		
Lights	459	17
People	0	0
Misc	0	0
Sub Total ==>	459	17
Ceiling Load	0	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	2,757	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	-145	-145	8.58
Glass Solar	0	0	0.00
Glass/Door Cond	-228	-228	13.51
Wall Cond	-788	-788	46.67
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	0.00	0.00
Infiltration	-527	-527	31.24
Sub Total ==>	-1,688	-1,688	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	0	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,688	-1,688	100.00

TEMPERATURES

	Cooling	Heating
SADB	64.1	64.8
Ra Plenum	80.0	55.0
Return	80.0	55.0
Ret/OA	80.0	55.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	157	157
Terminal	157	157
Main Fan	157	157
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	16	16
MinStop/Rh	0	0
Return	173	173
Exhaust	16	16
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.87	0.87
cfm/ton	611.68	
ft²/ton	703.29	
Btu/hr·ft²	17.06	-9.38
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB/WB/HR °F	Enter DB/WB/HR °F	Enter DB/WB/HR gr/lb	Leave DB/WB/HR °F	Leave DB/WB/HR °F	Leave DB/WB/HR gr/lb
Main Clg	0.3	3.1	2.8	157	80.1	66.6	77.5	64.1	60.7	74.8
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.3	3.1								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	180		
Part	0		
Int Door	0		
ExFlr	0		
Roof	180	0	0
Wall	297	0	0
Ext Door	21	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.7	157	55.0	64.8
Aux Htg	0.0	0	0.0	0.0
Preheat	-1.6	157	55.0	64.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-1.7			

System Checksums

By HDR

SS-2 **Incremental Heat Pump**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 6 / 11
Outside Air: OADB/WB/HR: 86 / 69 / 83

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	892	265	1,157	16
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-10.16	-10.16	-0.14
Infiltration	0		0	0
Sub Total ==>	892	255	1,147	15
Internal Loads				
Lights	140	140	280	4
People	0	0	0	0
Misc	6,000	0	6,000	81
Sub Total ==>	6,140	140	6,280	84
Ceiling Load	395	-395	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			21	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	7,428	0	7,448	100.00

CLG SPACE PEAK

Mo/Hr: Sum of
OADB: Peaks

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	892	12
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	892	12
Internal Loads		
Lights	140	2
People	0	0
Misc	6,000	81
Sub Total ==>	6,140	83
Ceiling Load	395	5
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	7,428	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-360	-447	43.46
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-581.06	56.54
Infiltration	0	0	0.00
Sub Total ==>	-360	-1,028	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-413	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-773	-1,028	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	70.0
Ra Plenum	85.4	56.1
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	354	354
Terminal	354	354
Main Fan	354	354
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	0	0
Return	354	354
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	3.22	3.22
cfm/ton	570.21	
ft²/ton	177.22	
Btu/hr·ft²	67.71	-7.03
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.6	7.5	7.5	354	74.1	56.6	41.4	55.0	48.6	41.1
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.6	7.5								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	110		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	126	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.8	354	68.0	70.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-0.8			

System Checksums

By HDR

UH-1 **Unit Heaters**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 0 / 0
Outside Air: OADB/WB/HR: 0 / 0 / 0

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	0		0	0
Sub Total ==>	0	0	0	0
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
***Grand Total* ==>**	0	0	0	100.00

CLG SPACE PEAK

Mo/Hr: 0 / 0
OADB: 0

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load	0	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
***Grand Total* ==>**	0	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-80	3.93
Glass Solar	0	0	0.00
Glass/Door Cond	-751	-751	37.06
Wall Cond	-766	-1,000	49.36
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	0.00	0.00
Infiltration	-196	-196	9.66
Sub Total ==>	-1,713	-2,027	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-314	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
***Grand Total* ==>**	-2,027	-2,027	100.00

TEMPERATURES

	Cooling	Heating
SADB	0.0	125.0
Ra Plenum	0.0	57.2
Return	0.0	68.0
Ret/OA	0.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	32
Terminal	0	32
Main Fan	0	32
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	4
MinStop/Rh	0	0
Return	0	36
Exhaust	0	4
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.00	0.35
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	-22.03
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB/WB/HR °F	Enter DB/WB/HR °F	Enter DB/WB/HR gr/lb	Leave DB/WB/HR °F	Leave DB/WB/HR °F	Leave DB/WB/HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	92		
Part	0		
Int Door	0		
ExFlr	0		
Roof	92	0	0
Wall	303	20	7
Ext Door	26	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.0	32	68.0	125.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.0			

System Checksums

By HDR

UH-2 **Unit Heaters**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 0 / 0
Outside Air: OADB/WB/HR: 0 / 0 / 0

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	0		0	0
Sub Total ==>	0	0	0	0
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
***Grand Total* ==>**	0	0	0	100.00

CLG SPACE PEAK

Mo/Hr: 0 / 0
OADB: 0

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load	0	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
***Grand Total* ==>**	0	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-751	-751	32.21
Wall Cond	-598	-777	33.31
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-548.99	23.54
Infiltration	-255	-255	10.95
Sub Total ==>	-1,604	-2,332	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-497	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
***Grand Total* ==>**	-2,101	-2,332	100.00

TEMPERATURES

	Cooling	Heating
SADB	0.0	125.0
Ra Plenum	0.0	54.9
Return	0.0	68.0
Ret/OA	0.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	33
Terminal	0	33
Main Fan	0	33
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	5
MinStop/Rh	0	0
Return	0	39
Exhaust	0	5
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.00	0.28
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	-17.51
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB/WB/HR °F	Enter DB/WB/HR °F	Enter DB/WB/HR gr/lb	Leave DB/WB/HR °F	Leave DB/WB/HR °F	Leave DB/WB/HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	120		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	245	20	8
Ext Door	26	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.1	33	68.0	125.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.1			

System Checksums

By HDR

UH-1 **Unit Heaters**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 0 / 0
Outside Air: OADB/WB/HR: 0 / 0 / 0

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	0		0	0
Sub Total ==>	0	0	0	0
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
***Grand Total* ==>**	0	0	0	100.00

CLG SPACE PEAK

Mo/Hr: 0 / 0
OADB: 0

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load	0	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
***Grand Total* ==>**	0	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-80	3.93
Glass Solar	0	0	0.00
Glass/Door Cond	-751	-751	37.06
Wall Cond	-766	-1,000	49.36
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	0.00	0.00
Infiltration	-196	-196	9.66
Sub Total ==>	-1,713	-2,027	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-314	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
***Grand Total* ==>**	-2,027	-2,027	100.00

TEMPERATURES

	Cooling	Heating
SADB	0.0	125.0
Ra Plenum	0.0	57.2
Return	0.0	68.0
Ret/OA	0.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	32
Terminal	0	32
Main Fan	0	32
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	4
MinStop/Rh	0	0
Return	0	36
Exhaust	0	4
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.00	0.35
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	-22.03
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB/WB/HR °F	Enter DB/WB/HR °F	Enter DB/WB/HR gr/lb	Leave DB/WB/HR °F	Leave DB/WB/HR °F	Leave DB/WB/HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total ft²	Glass ft²	Glass (%)
Floor	92		
Part	0		
Int Door	0		
ExFlr	0		
Roof	92	0	0
Wall	303	20	7
Ext Door	26	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.0	32	68.0	125.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.0			

System Checksums

By HDR

UH-2 **Unit Heaters**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 0 / 0
Outside Air: OADB/WB/HR: 0 / 0 / 0

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	0		0	0
Sub Total ==>	0	0	0	0
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	0	0	0	100.00

CLG SPACE PEAK

Mo/Hr: 0 / 0
OADB: 0

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load	0	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	0	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-751	-751	32.20
Wall Cond	-598	-778	33.33
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-548.99	23.53
Infiltration	-255	-255	10.94
Sub Total ==>	-1,604	-2,333	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-492	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-2,096	-2,333	100.00

TEMPERATURES

	Cooling	Heating
SADB	0.0	125.0
Ra Plenum	0.0	55.1
Return	0.0	68.0
Ret/OA	0.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	33
Terminal	0	33
Main Fan	0	33
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	5
MinStop/Rh	0	0
Return	0	39
Exhaust	0	5
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.00	0.28
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	-17.47
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB/WB/HR °F	Enter DB/WB/HR °F	Enter DB/WB/HR gr/lb	Leave DB/WB/HR °F	Leave DB/WB/HR °F	Leave DB/WB/HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	120		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	245	20	8
Ext Door	26	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.1	33	68.0	125.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.1			

System Checksums

By HDR

VRF **Variable Refrigerant Flow**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 17
Outside Air: OADB/WB/HR: 94 / 75 / 105

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	8,853	8,853	10
Glass Solar	2,604	0	2,604	3
Glass/Door Cond	1,479	0	1,479	2
Wall Cond	24,353	4,498	28,851	32
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	985.03	-853.18	131.85	0.15
Infiltration	4,097		4,097	5
Sub Total ==>	33,517	12,498	46,015	51
Internal Loads				
Lights	6,340	5,882	12,222	14
People	18,337	0	18,337	20
Misc	18,317	0	18,317	20
Sub Total ==>	42,995	5,882	48,876	54
Ceiling Load	18,268	-18,268	0	0
Ventilation Load	-5,878	0	-5,878	-7
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	34		34	0
Exhaust Heat		139	139	0
Sup. Fan Heat			1,145	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	88,936	251	90,332	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	5,100	6
Glass/Door Cond	887	1
Wall Cond	29,538	34
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	985.03	1.12
Infiltration	1,453	2
Sub Total ==>	37,963	43
Internal Loads		
Lights	6,327	7
People	10,000	11
Misc	18,367	21
Sub Total ==>	34,694	39
Ceiling Load	17,804	20
Ventilation Load	-2,850	-3
Adj Air Trans Heat	0	0
Ov/Undr Sizing	355	0
Grand Total ==>	87,967	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-4,166	7.30
Glass Solar	0	0	0.00
Glass/Door Cond	-2,996	-2,996	5.25
Wall Cond	-11,061	-12,837	22.50
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	8,521.95	548.99	-0.96
Infiltration	-3,662	-3,662	6.42
Sub Total ==>	-9,197	-23,113	40.51
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-13,923	0	0.00
Ventilation Load	2,408	2,408	-4.22
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-15,929	-15,929	27.92
Exhaust Heat		341	-0.60
OA Preheat Diff.		-20,755	36.38
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-36,641	-57,048	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.2	79.8
Ra Plenum	85.7	51.7
Return	74.3	67.6
Ret/OA	74.3	67.6
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	3,864	3,864
Terminal	3,864	3,864
Main Fan	3,864	3,864
Sec Fan	0	0
Nom Vent	1,090	1,090
AHU Vent	1,090	1,090
Infil	82	82
MinStop/Rh	386	386
Return	5,037	5,037
Exhaust	1,172	1,172
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	28.2	28.2
cfm/ft²	0.41	0.41
cfm/ton	267.90	
ft²/ton	658.12	
Btu/hr·ft²	18.23	-8.30
No. People	41	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	7.5	90.3	82.8	3,864	74.6	64.9	77.7	56.2	56.2	68.2
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	6.9	82.8	39.1	1,090	82.5	73.3	110.6	50.0	49.9	53.9
Total	14.4	173.1								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	9,493		
Part	0		
Int Door	0		
ExFlr	4,723		
Roof	4,925	0	0
Wall	4,350	128	3
Ext Door	54	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-52.3	3,864	67.6	79.8
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-26.5	1,090	50.0	72.0
Total	-78.8			

System Checksums

By HDR

AHU - OFFICE — **Variable Volume Reheat (30% Min Flow Default)**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 16
Outside Air: OADB/WB/HR: 95 / 76 / 107

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	9,991	9,991	8
Glass Solar	2,495	0	2,495	2
Glass/Door Cond	1,438	0	1,438	1
Wall Cond	20,385	3,999	24,385	20
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	1,103.05	-1,085.02	18.03	0.01
Infiltration	3,542		3,542	3
Sub Total ==>	28,963	12,905	41,868	34
Internal Loads				
Lights	5,485	5,485	10,970	9
People	18,220	0	18,220	15
Misc	11,758	0	11,758	10
Sub Total ==>	35,463	5,485	40,948	33
Ceiling Load	18,344	-18,344	0	0
Ventilation Load	0	0	34,747	28
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	-4,320		-4,320	-4
Exhaust Heat		17	17	0
Sup. Fan Heat			9,390	8
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	78,449	63	122,649	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	2,604	3
Glass/Door Cond	1,364	2
Wall Cond	22,421	30
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	901.73	1.20
Infiltration	1,452	2
Sub Total ==>	28,743	38
Internal Loads		
Lights	5,742	8
People	10,187	14
Misc	12,317	16
Sub Total ==>	28,246	38
Ceiling Load	17,665	24
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	183	0
Grand Total ==>	74,836	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-4,040	6.19
Glass Solar	0	0	0.00
Glass/Door Cond	-2,768	-2,768	4.24
Wall Cond	-9,918	-11,617	17.81
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	8,462.38	1,130.05	-1.73
Infiltration	-3,138	-3,138	4.81
Sub Total ==>	-7,361	-20,433	31.33
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-13,108	0	0.00
Ventilation Load	0	-30,843	47.29
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-1,199	1.84
RA Preheat Diff.		-12,748	19.55
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-20,469	-65,224	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.5	88.1
Ra Plenum	86.0	51.7
Return	74.1	68.0
Ret/OA	77.6	51.0
Fn MtrTD	0.2	0.0
Fn BldTD	0.5	0.0
Fn Frict	1.5	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	4,332	1,640
Terminal	4,332	1,640
Main Fan	4,332	1,640
Sec Fan	0	0
Nom Vent	652	652
AHU Vent	652	652
Infil	66	66
MinStop/Rh	1,640	1,640
Return	4,398	1,706
Exhaust	719	719
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	15.1	39.8
cfm/ft²	0.47	0.18
cfm/ton	423.79	
ft²/ton	900.42	
Btu/hr·ft²	13.33	-8.70
No. People	41	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB/WB/HR °F	Enter DB/WB/HR °F	Enter DB/WB/HR gr/lb	Leave DB/WB/HR °F	Leave DB/WB/HR °F	Leave DB/WB/HR gr/lb
Main Clg	10.2	122.7	93.1	3,962	77.6	64.6	71.2	56.3	54.4	60.6
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	10.2	122.7								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	9,203		
Part	0		
Int Door	0		
ExFlr	4,723		
Roof	4,745	0	0
Wall	3,927	128	3
Ext Door	33	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-57.6	1,640	56.3	88.1
Aux Htg	0.0	0	0.0	0.0
Preheat	-22.4	652	25.2	56.3
Reheat	-21.2	1,640	56.3	68.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-80.1			

System Checksums

By HDR

SS-1 **Incremental Heat Pump**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 17
Outside Air: OADB/WB/HR: 94 / 75 / 105

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	393	0	393	13
Glass Solar	0	0	0	0
Glass/Door Cond	115	0	115	4
Wall Cond	1,546	0	1,546	50
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	550		550	18
Sub Total ==>	2,603	0	2,603	85
Internal Loads				
Lights	459	0	459	15
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	459	0	459	15
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			9	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	3,062	0	3,071	100.00

CLG SPACE PEAK

Mo/Hr: Sum of
OADB: Peaks

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	393	14
Glass Solar	0	0
Glass/Door Cond	115	4
Wall Cond	1,546	56
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	244	9
Sub Total ==>	2,298	83
Internal Loads		
Lights	459	17
People	0	0
Misc	0	0
Sub Total ==>	459	17
Ceiling Load	0	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	2,757	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	-145	-145	8.58
Glass Solar	0	0	0.00
Glass/Door Cond	-228	-228	13.51
Wall Cond	-788	-788	46.67
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	0.00	0.00
Infiltration	-527	-527	31.24
Sub Total ==>	-1,688	-1,688	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	0	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,688	-1,688	100.00

TEMPERATURES

	Cooling	Heating
SADB	64.1	64.8
Ra Plenum	80.0	55.0
Return	80.0	55.0
Ret/OA	80.0	55.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	157	157
Terminal	157	157
Main Fan	157	157
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	16	16
MinStop/Rh	0	0
Return	173	173
Exhaust	16	16
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.87	0.87
cfm/ton	611.68	
ft²/ton	703.29	
Btu/hr·ft²	17.06	-9.38
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB/WB/HR °F	Enter DB/WB/HR °F	Enter DB/WB/HR gr/lb	Leave DB/WB/HR °F	Leave DB/WB/HR °F	Leave DB/WB/HR gr/lb
Main Clg	0.3	3.1	2.8	157	80.1	66.6	77.5	64.1	60.7	74.8
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.3	3.1								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	180		
Part	0		
Int Door	0		
ExFlr	0		
Roof	180	0	0
Wall	297	0	0
Ext Door	21	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.7	157	55.0	64.8
Aux Htg	0.0	0	0.0	0.0
Preheat	-1.6	157	55.0	64.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-1.7			

System Checksums

By HDR

SS-2 **Incremental Heat Pump**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 6 / 11
Outside Air: OADB/WB/HR: 86 / 69 / 83

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	892	265	1,157	16
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-10.56	-10.56	-0.14
Infiltration	0		0	0
Sub Total ==>	892	255	1,147	15
Internal Loads				
Lights	140	140	280	4
People	0	0	0	0
Misc	6,000	0	6,000	81
Sub Total ==>	6,140	140	6,280	84
Ceiling Load	396	-396	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			21	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	7,428	-1	7,448	100.00

CLG SPACE PEAK

Mo/Hr: Sum of
OADB: Peaks

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	892	12
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	892	12
Internal Loads		
Lights	140	2
People	0	0
Misc	6,000	81
Sub Total ==>	6,140	83
Ceiling Load	396	5
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	7,428	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-360	-448	43.53
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-581.06	56.47
Infiltration	0	0	0.00
Sub Total ==>	-360	-1,029	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-398	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-758	-1,029	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	69.9
Ra Plenum	85.4	56.6
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	354	354
Terminal	354	354
Main Fan	354	354
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	0	0
Return	354	354
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	3.22	3.22
cfm/ton	570.28	
ft²/ton	177.23	
Btu/hr·ft²	67.71	-6.89
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB/WB/HR °F	Enter DB/WB/HR °F	Enter DB/WB/HR gr/lb	Leave DB/WB/HR °F	Leave DB/WB/HR °F	Leave DB/WB/HR gr/lb
Main Clg	0.6	7.5	7.5	354	74.1	56.6	41.4	55.0	48.6	41.1
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.6	7.5								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	110		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	126	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.8	354	68.0	69.9
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-0.8			

System Checksums

By HDR

UH-1 **Unit Heaters**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 0 / 0
Outside Air: OADB/WB/HR: 0 / 0 / 0

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	0		0	0
Sub Total ==>	0	0	0	0
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
***Grand Total* ==>**	0	0	0	100.00

CLG SPACE PEAK

Mo/Hr: 0 / 0
OADB: 0

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load	0	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
***Grand Total* ==>**	0	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-80	3.93
Glass Solar	0	0	0.00
Glass/Door Cond	-751	-751	37.06
Wall Cond	-766	-1,000	49.36
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	0.00	0.00
Infiltration	-196	-196	9.66
Sub Total ==>	-1,713	-2,027	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-314	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
***Grand Total* ==>**	-2,027	-2,027	100.00

TEMPERATURES

	Cooling	Heating
SADB	0.0	125.0
Ra Plenum	0.0	57.2
Return	0.0	68.0
Ret/OA	0.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	32
Terminal	0	32
Main Fan	0	32
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	4
MinStop/Rh	0	0
Return	0	36
Exhaust	0	4
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.00	0.35
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	-22.03
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB/WB/HR °F	Enter DB/WB/HR °F	Enter DB/WB/HR gr/lb	Leave DB/WB/HR °F	Leave DB/WB/HR °F	Leave DB/WB/HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	92		
Part	0		
Int Door	0		
ExFlr	0		
Roof	92	0	0
Wall	303	20	7
Ext Door	26	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.0	32	68.0	125.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.0			

System Checksums

By HDR

UH-2 **Unit Heaters**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 0 / 0
Outside Air: OADB/WB/HR: 0 / 0 / 0

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	0		0	0
Sub Total ==>	0	0	0	0
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
***Grand Total* ==>**	0	0	0	100.00

CLG SPACE PEAK

Mo/Hr: 0 / 0
OADB: 0

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load	0	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
***Grand Total* ==>**	0	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-751	-751	32.18
Wall Cond	-598	-779	33.37
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-548.99	23.52
Infiltration	-255	-255	10.94
Sub Total ==>	-1,604	-2,334	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-482	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
***Grand Total* ==>**	-2,087	-2,334	100.00

TEMPERATURES

	Cooling	Heating
SADB	0.0	125.0
Ra Plenum	0.0	55.3
Return	0.0	68.0
Ret/OA	0.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	33
Terminal	0	33
Main Fan	0	33
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	5
MinStop/Rh	0	0
Return	0	39
Exhaust	0	5
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.00	0.28
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	-17.39
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB/WB/HR °F	Enter DB/WB/HR °F	Enter DB/WB/HR gr/lb	Leave DB/WB/HR °F	Leave DB/WB/HR °F	Leave DB/WB/HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	120		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	245	20	8
Ext Door	26	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.1	33	68.0	125.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.1			

System Checksums

By HDR

RTU-1 — **System 3 - 2007/2010 - Packaged Rooftop Air Conditioner**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 96 / 77 / 111

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	1,668	0	1,668	2
Glass/Door Cond	783	0	783	1
Wall Cond	5,534	1,819	7,353	11
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	1,889.83	1,889.83	2.78
Infiltration	3,662		3,662	5
Sub Total ==>	11,647	3,709	15,356	23
Internal Loads				
Lights	3,092	3,092	6,185	9
People	7,021	0	7,021	10
Misc	4,505	0	4,505	7
Sub Total ==>	14,619	3,092	17,711	26
Ceiling Load	6,551	-6,551	0	0
Ventilation Load	0	0	17,193	25
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			13,023	19
Ov/Undr Sizing	4,133		4,133	6
Exhaust Heat		0	0	0
Sup. Fan Heat			477	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	36,950	250	67,893	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	1,992	6
Glass/Door Cond	568	2
Wall Cond	7,356	22
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	1,259	4
Sub Total ==>	11,176	33
Internal Loads		
Lights	3,236	10
People	3,937	12
Misc	4,787	14
Sub Total ==>	11,960	35
Ceiling Load	6,774	20
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	4,133	12
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	34,043	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-1,496	-1,496	2.61
Wall Cond	-2,985	-3,806	6.65
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-14,785.40	25.83
Infiltration	-3,138	-3,138	5.48
Sub Total ==>	-7,619	-23,225	40.58
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-8,954	0	0.00
Ventilation Load	0	-14,716	25.71
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-3,933	-3,933	6.87
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-15,357	26.83
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-20,506	-57,232	100.00

TEMPERATURES

	Cooling	Heating
SADB	54.9	79.5
Ra Plenum	82.2	56.9
Return	74.1	68.0
Ret/OA	78.3	59.7
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	1,609	1,609
Terminal	1,609	1,609
Main Fan	1,609	1,609
Sec Fan	0	0
Nom Vent	311	311
AHU Vent	311	311
Infil	66	66
MinStop/Rh	1,609	1,609
Return	1,675	1,675
Exhaust	378	378
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	19.3	19.3
cfm/ft²	0.63	0.63
cfm/ton	255.72	
ft²/ton	406.07	
Btu/hr·ft²	29.55	-24.75
No. People	16	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	6.3	75.5	46.6	1,609	78.3	65.0	72.2	51.1	48.8	48.2
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	6.3	75.5								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	2,555		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	1,130	56	5
Ext Door	33	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-63.2	1,609	51.1	79.5
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-42.1	1,609	50.4	74.1
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-63.2			

System Checksums

By HDR

RTU-2 — **System 3 - 2007/2010 - Packaged Rooftop Air Conditioner**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 16
Outside Air: OADB/WB/HR: 95 / 76 / 107

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	9,743	9,743	10
Glass Solar	1,432	0	1,432	1
Glass/Door Cond	555	0	555	1
Wall Cond	16,858	2,870	19,729	20
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	-258.51	-1,467.78	-1,726.29	-1.78
Infiltration	0		0	0
Sub Total ==>	18,587	11,146	29,733	31
Internal Loads				
Lights	2,371	2,371	4,743	5
People	10,923	0	10,923	11
Misc	7,146	0	7,146	7
Sub Total ==>	20,441	2,371	22,812	23
Ceiling Load	12,758	-12,758	0	0
Ventilation Load	0	0	16,074	17
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			25,217	26
Ov/Undr Sizing	2,781		2,781	3
Exhaust Heat		0	0	0
Sup. Fan Heat			615	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	54,567	759	97,231	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	3,376	6
Glass/Door Cond	237	0
Wall Cond	19,976	37
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	-270.53	-0.50
Infiltration	0	0
Sub Total ==>	23,319	43
Internal Loads		
Lights	2,465	5
People	6,063	11
Misc	7,542	14
Sub Total ==>	16,070	30
Ceiling Load	11,553	22
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	2,781	5
Grand Total ==>	53,723	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-3,645	6.43
Glass Solar	0	0	0.00
Glass/Door Cond	-1,272	-1,272	2.24
Wall Cond	-6,933	-7,829	13.81
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	17,802.80	15,915.45	-28.08
Infiltration	0	0	0.00
Sub Total ==>	9,598	3,169	-5.59
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-6,429	0	0.00
Ventilation Load	0	-14,181	25.02
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-18,842	-18,842	33.24
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-26,826	47.33
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-15,673	-56,680	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.0	83.9
Ra Plenum	87.9	48.7
Return	74.1	68.0
Ret/OA	77.2	61.8
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	2,075	2,075
Terminal	2,075	2,075
Main Fan	2,075	2,075
Sec Fan	0	0
Nom Vent	300	300
AHU Vent	300	300
Infil	0	0
MinStop/Rh	2,075	2,075
Return	2,075	2,075
Exhaust	300	300
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	14.5	14.5
cfm/ft²	0.31	0.31
cfm/ton	283.41	
ft²/ton	908.03	
Btu/hr·ft²	13.22	-14.56
No. People	25	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	7.3	87.9	52.9	2,075	77.2	63.9	68.5	50.1	49.1	50.7
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	7.3	87.9								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	6,648		
Part	0		
Int Door	0		
ExFlr	4,723		
Roof	4,745	0	0
Wall	2,796	72	3
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-96.8	2,075	50.1	83.9
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-51.9	2,075	51.5	74.1
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-96.8			

System Checksums

By HDR

SS-1 **Incremental Heat Pump**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 17
Outside Air: OADB/WB/HR: 94 / 75 / 105

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	393	0	393	13
Glass Solar	0	0	0	0
Glass/Door Cond	115	0	115	4
Wall Cond	1,546	0	1,546	50
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	550		550	18
Sub Total ==>	2,603	0	2,603	85
Internal Loads				
Lights	459	0	459	15
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	459	0	459	15
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			9	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	3,062	0	3,071	100.00

CLG SPACE PEAK

Mo/Hr: Sum of
OADB: Peaks

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	393	14
Glass Solar	0	0
Glass/Door Cond	115	4
Wall Cond	1,546	56
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	244	9
Sub Total ==>	2,298	83
Internal Loads		
Lights	459	17
People	0	0
Misc	0	0
Sub Total ==>	459	17
Ceiling Load	0	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	2,757	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	-145	-145	8.58
Glass Solar	0	0	0.00
Glass/Door Cond	-228	-228	13.51
Wall Cond	-788	-788	46.67
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	0.00	0.00
Infiltration	-527	-527	31.24
Sub Total ==>	-1,688	-1,688	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	0	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,688	-1,688	100.00

TEMPERATURES

	Cooling	Heating
SADB	64.1	64.8
Ra Plenum	80.0	55.0
Return	80.0	55.0
Ret/OA	80.0	55.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	157	157
Terminal	157	157
Main Fan	157	157
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	16	16
MinStop/Rh	0	0
Return	173	173
Exhaust	16	16
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.87	0.87
cfm/ton	611.68	
ft²/ton	703.29	
Btu/hr·ft²	17.06	-9.38
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB/WB/HR °F	Enter DB/WB/HR °F	Enter DB/WB/HR gr/lb	Leave DB/WB/HR °F	Leave DB/WB/HR °F	Leave DB/WB/HR gr/lb
Main Clg	0.3	3.1	2.8	157	80.1	66.6	77.5	64.1	60.7	74.8
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.3	3.1								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	180		
Part	0		
Int Door	0		
ExFlr	0		
Roof	180	0	0
Wall	297	0	0
Ext Door	21	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.7	157	55.0	64.8
Aux Htg	0.0	0	0.0	0.0
Preheat	-1.6	157	55.0	64.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-1.7			

System Checksums

By HDR

SS-2 **Incremental Heat Pump**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 6 / 11
Outside Air: OADB/WB/HR: 86 / 69 / 83

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	892	265	1,157	16
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-10.16	-10.16	-0.14
Infiltration	0		0	0
Sub Total ==>	892	255	1,147	15
Internal Loads				
Lights	140	140	280	4
People	0	0	0	0
Misc	6,000	0	6,000	81
Sub Total ==>	6,140	140	6,280	84
Ceiling Load	395	-395	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			21	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	7,428	0	7,448	100.00

CLG SPACE PEAK

Mo/Hr: Sum of
OADB: Peaks

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	892	12
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	892	12
Internal Loads		
Lights	140	2
People	0	0
Misc	6,000	81
Sub Total ==>	6,140	83
Ceiling Load	395	5
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	7,428	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-360	-447	43.46
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-581.06	56.54
Infiltration	0	0	0.00
Sub Total ==>	-360	-1,028	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-413	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-773	-1,028	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	70.0
Ra Plenum	85.4	56.1
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	354	354
Terminal	354	354
Main Fan	354	354
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	0	0
Return	354	354
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	3.22	3.22
cfm/ton	570.21	
ft²/ton	177.22	
Btu/hr·ft²	67.71	-7.03
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB/WB/HR °F	Enter DB/WB/HR °F	Enter DB/WB/HR gr/lb	Leave DB/WB/HR °F	Leave DB/WB/HR °F	Leave DB/WB/HR gr/lb
Main Clg	0.6	7.5	7.5	354	74.1	56.6	41.4	55.0	48.6	41.1
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.6	7.5								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	110		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	126	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.8	354	68.0	70.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-0.8			

System Checksums

By HDR

UH-1 **Unit Heaters**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 0 / 0
Outside Air: OADB/WB/HR: 0 / 0 / 0

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	0		0	0
Sub Total ==>	0	0	0	0
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
***Grand Total* ==>**	0	0	0	100.00

CLG SPACE PEAK

Mo/Hr: 0 / 0
OADB: 0

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load	0	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
***Grand Total* ==>**	0	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-80	3.93
Glass Solar	0	0	0.00
Glass/Door Cond	-751	-751	37.06
Wall Cond	-766	-1,000	49.36
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	0.00	0.00
Infiltration	-196	-196	9.66
Sub Total ==>	-1,713	-2,027	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-314	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
***Grand Total* ==>**	-2,027	-2,027	100.00

TEMPERATURES

	Cooling	Heating
SADB	0.0	125.0
Ra Plenum	0.0	57.2
Return	0.0	68.0
Ret/OA	0.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	32
Terminal	0	32
Main Fan	0	32
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	4
MinStop/Rh	0	0
Return	0	36
Exhaust	0	4
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.00	0.35
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	-22.03
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB/WB/HR °F	Enter DB/WB/HR °F	Enter DB/WB/HR gr/lb	Leave DB/WB/HR °F	Leave DB/WB/HR °F	Leave DB/WB/HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total ft²	Glass ft²	Glass (%)
Floor	92		
Part	0		
Int Door	0		
ExFlr	0		
Roof	92	0	0
Wall	303	20	7
Ext Door	26	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.0	32	68.0	125.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.0			

System Checksums

By HDR

UH-2 **Unit Heaters**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 0 / 0
Outside Air: OADB/WB/HR: 0 / 0 / 0

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	0		0	0
Sub Total ==>	0	0	0	0
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	0	0	0	100.00

CLG SPACE PEAK

Mo/Hr: 0 / 0
OADB: 0

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load	0	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	0	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-751	-751	32.21
Wall Cond	-598	-777	33.31
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-548.99	23.54
Infiltration	-255	-255	10.95
Sub Total ==>	-1,604	-2,332	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-497	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-2,101	-2,332	100.00

TEMPERATURES

	Cooling	Heating
SADB	0.0	125.0
Ra Plenum	0.0	54.9
Return	0.0	68.0
Ret/OA	0.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	33
Terminal	0	33
Main Fan	0	33
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	5
MinStop/Rh	0	0
Return	0	39
Exhaust	0	5
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.00	0.28
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	-17.51
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB/WB/HR °F	Enter DB/WB/HR °F	Enter DB/WB/HR gr/lb	Leave DB/WB/HR °F	Leave DB/WB/HR °F	Leave DB/WB/HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	120		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	245	20	8
Ext Door	26	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.1	33	68.0	125.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.1			

Zone Checksums

By HDR

100 VESTIBULE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 0 / 0
Outside Air: OADB/WB/HR: 0 / 0 / 0

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	0		0	0
Sub Total ==>	0	0	0	0
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	0	0	0	100.00

CLG SPACE PEAK

Mo/Hr: 0 / 0
OADB: 0

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load	0	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	0	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-80	3.93
Glass Solar	0	0	0.00
Glass/Door Cond	-751	-751	37.06
Wall Cond	-766	-1,000	49.36
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	0.00	0.00
Infiltration	-196	-196	9.66
Sub Total ==>	-1,713	-2,027	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-314	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-2,027	-2,027	100.00

TEMPERATURES

	Cooling	Heating
SADB	0.0	125.0
Ra Plenum	0.0	57.2
Return	0.0	68.0
Ret/OA	0.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	32
Terminal	0	32
Main Fan	0	32
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	4
MinStop/Rh	0	0
Return	0	36
Exhaust	0	4
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.00	0.35
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	-22.03
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	92		
Part	0		
Int Door	0		
ExFlr	0		
Roof	92	0	0
Wall	303	20	7
Ext Door	26	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.0	32	68.0	125.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.0			

Zone Checksums

By HDR

109 VESTIBULE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 0 / 0
Outside Air: OADB/WB/HR: 0 / 0 / 0

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	0		0	0
Sub Total ==>	0	0	0	0
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	0	0	0	100.00

CLG SPACE PEAK

Mo/Hr: 0 / 0
OADB: 0

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load	0	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	0	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-751	-751	28.34
Wall Cond	-598	-777	29.31
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-548.99	20.72
Infiltration	-255	-255	9.63
Sub Total ==>	-1,604	-2,332	88.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-497	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-318	12.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-2,101	-2,650	100.00

TEMPERATURES

	Cooling	Heating
SADB	0.0	125.0
Ra Plenum	0.0	54.9
Return	0.0	68.0
Ret/OA	0.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	33
Terminal	0	33
Main Fan	0	33
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	5
MinStop/Rh	0	0
Return	0	39
Exhaust	0	5
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.00	0.28
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	-17.51
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	120		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	245	20	8
Ext Door	26	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.1	33	68.0	125.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.1			

Zone Checksums

By HDR

ATTIC

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 16
Outside Air: OADB/WB/HR: 95 / 76 / 107

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	9,994	9,994	53
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	7,601	100	7,701	41
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	1,182.33	0.00	1,182.33	6.26
Infiltration	0		0	0
Sub Total ==>	8,783	10,094	18,877	100
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	1,451	-1,451	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	10,234	8,643	18,877	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	8,820	81
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	960.46	8.82
Infiltration	0	0
Sub Total ==>	9,781	90
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load	1,112	10
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	10,893	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-4,019	-24.66
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-2,510	-2,553	-15.66
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	9,001.88	9,001.88	55.23
Infiltration	0	0	0.00
Sub Total ==>	6,492	2,430	14.91
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	9,808	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		13,869	85.09
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	16,299	16,299	100.00

TEMPERATURES

	Cooling	Heating
SADB	85.0	45.0
Ra Plenum	86.0	51.6
Return	86.0	51.6
Ret/OA	86.0	51.6
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	0
Terminal	0	0
Main Fan	0	0
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	0	0
Return	0	0
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.00	0.00
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	0.00
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	4,710		
Part	0		
Int Door	0		
ExFlr	4,723		
Roof	4,745	0	0
Wall	1,152	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	0.0	0	0.0	0.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	51.6	84.7
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	0.0			

Zone Checksums

By HDR

Zone - 001A

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 17
Outside Air: OADB/WB/HR: 94 / 75 / 105

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	2,453	0	2,453	13
Glass/Door Cond	312	0	312	2
Wall Cond	4,920	1,596	6,515	34
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	12.78	12.78	0.07
Infiltration	1,965		1,965	10
Sub Total ==>	9,650	1,609	11,259	59
Internal Loads				
Lights	1,395	1,395	2,791	15
People	5,400	0	5,400	28
Misc	1,596	0	1,596	8
Sub Total ==>	8,391	1,395	9,786	51
Ceiling Load	3,906	-3,906	0	0
Ventilation Load	-2,111	0	-2,111	-11
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			289	2
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	19,836	-902	19,223	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	2,453	14
Glass/Door Cond	312	2
Wall Cond	4,920	27
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	846	5
Sub Total ==>	8,531	47
Internal Loads		
Lights	1,408	8
People	3,000	17
Misc	1,596	9
Sub Total ==>	6,004	33
Ceiling Load	4,124	23
Ventilation Load	-530	-3
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	18,129	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-636	-636	3.98
Wall Cond	-1,772	-2,165	13.54
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-1,971.02	12.33
Infiltration	-1,829	-1,829	11.44
Sub Total ==>	-4,238	-6,601	41.29
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-5,856	0	0.00
Ventilation Load	530	530	-3.32
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-4,453	27.85
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-5,464	34.17
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-9,564	-15,988	100.00

TEMPERATURES

	Cooling	Heating
SADB	57.2	76.9
Ra Plenum	85.0	51.6
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	975	975
Terminal	975	975
Main Fan	975	975
Sec Fan	0	0
Nom Vent	240	240
AHU Vent	240	240
Infil	39	39
MinStop/Rh	0	0
Return	1,254	1,254
Exhaust	279	279
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	24.6	24.6
cfm/ft²	0.87	0.87
cfm/ton	288.45	
ft²/ton	332.80	
Btu/hr·ft²	36.06	-13.69
No. People	12	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB/WB/HR °F	Enter DB/WB/HR °F	Enter DB/WB/HR gr/lb	Leave DB/WB/HR °F	Leave DB/WB/HR °F	Leave DB/WB/HR gr/lb
Main Clg	1.6	19.2	17.3	975	74.3	61.8	63.4	57.2	55.1	62.1
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	1.8	21.3	12.3	240	96.4	76.5	107.1	50.0	49.9	53.9
Total	3.4	40.6								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	1,125		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	668	36	5
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-9.6	975	68.0	76.9
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-5.8	240	50.0	72.0
Total	-15.4			

Zone Checksums

By HDR

Zone - 002A

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 11
Outside Air: OADB/WB/HR: 88 / 72 / 97

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	819	0	819	13
Glass/Door Cond	257	0	257	4
Wall Cond	2,437	822	3,259	53
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	14.61	14.61	0.24
Infiltration	1,065		1,065	17
Sub Total ==>	4,577	837	5,414	89
Internal Loads				
Lights	975	975	1,950	32
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	975	975	1,950	32
Ceiling Load	2,541	-2,541	0	0
Ventilation Load	-1,403	0	-1,403	-23
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			141	2
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
***Grand Total* ==>**	6,691	-730	6,102	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 11
OADB: 88

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	819	12
Glass/Door Cond	257	4
Wall Cond	2,437	34
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	413	6
Sub Total ==>	3,925	55
Internal Loads		
Lights	982	14
People	0	0
Misc	0	0
Sub Total ==>	982	14
Ceiling Load	2,654	37
Ventilation Load	-442	-6
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
***Grand Total* ==>**	7,119	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-860	-860	8.32
Wall Cond	-1,212	-1,503	14.53
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-1,340.30	12.96
Infiltration	-1,308	-1,308	12.65
Sub Total ==>	-3,381	-5,011	48.47
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-3,982	0	0.00
Ventilation Load	221	221	-2.14
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-1,856	17.95
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-3,692	35.71
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
***Grand Total* ==>**	-7,142	-10,338	100.00

TEMPERATURES

	Cooling	Heating
SADB	60.5	81.6
Ra Plenum	84.9	51.6
Return	74.4	68.0
Ret/OA	74.1	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	476	476
Terminal	476	476
Main Fan	476	476
Sec Fan	0	0
Nom Vent	100	100
AHU Vent	100	100
Infil	28	28
MinStop/Rh	0	0
Return	603	603
Exhaust	128	128
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	21.0	21.0
cfm/ft²	0.62	0.62
cfm/ton	373.08	
ft²/ton	599.86	
Btu/hr·ft²	20.00	-12.51
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB/WB/HR °F	Enter DB/WB/HR °F	Enter DB/WB/HR gr/lb	Leave DB/WB/HR °F	Leave DB/WB/HR °F	Leave DB/WB/HR gr/lb
Main Clg	0.5	6.4	6.4	476	74.7	62.1	64.3	60.5	56.9	64.3
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.7	8.9	5.1	100	96.4	76.5	107.1	50.0	49.9	53.9
Total	1.3	15.3								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	765		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	462	20	4
Ext Door	33	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-7.1	476	68.0	81.6
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-2.4	100	50.0	72.0
Total	-9.6			

Zone Checksums

By HDR

Zone - 002B

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 4 / 11
Outside Air: OADB/WB/HR: 70 / 58 / 55

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	56.29	56.29	1.59
Infiltration	0		0	0
Sub Total ==>	0	56	56	2
Internal Loads				
Lights	531	531	1,062	30
People	900	0	900	25
Misc	1,596	0	1,596	45
Sub Total ==>	3,027	531	3,558	101
Ceiling Load	1,380	-1,380	0	0
Ventilation Load	-139	0	-139	-4
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			57	2
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	4,268	-792	3,533	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	531	13
People	500	12
Misc	1,596	39
Sub Total ==>	2,627	65
Ceiling Load	1,544	38
Ventilation Load	-110	-3
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	4,061	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-727.09	19.63
Infiltration	0	0	0.00
Sub Total ==>	0	-727	19.63
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-2,160	0	0.00
Ventilation Load	110	110	-2.98
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-928	25.04
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-2,160	58.31
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-2,050	-3,705	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	77.6
Ra Plenum	84.5	51.6
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	194	194
Terminal	194	194
Main Fan	194	194
Sec Fan	0	0
Nom Vent	50	50
AHU Vent	50	50
Infil	0	0
MinStop/Rh	0	0
Return	244	244
Exhaust	50	50
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	25.8	25.8
cfm/ft²	0.47	0.47
cfm/ton	291.02	
ft²/ton	624.12	
Btu/hr·ft²	19.23	-7.87
No. People	2	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.3	3.5	3.2	194	74.3	61.8	63.4	55.0	54.5	63.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.4	4.5	2.6	50	96.4	76.5	107.1	50.0	49.9	53.9
Total	0.7	8.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	415		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.1	194	68.0	77.6
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-1.2	50	50.0	72.0
Total	-3.3			

Zone Checksums

By HDR

Zone - 002C

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 4 / 11
Outside Air: OADB/WB/HR: 70 / 58 / 55

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	33.91	33.91	1.14
Infiltration	0		0	0
Sub Total ==>	0	34	34	1
Internal Loads				
Lights	320	320	640	22
People	787	0	787	27
Misc	1,596	0	1,596	54
Sub Total ==>	2,702	320	3,022	102
Ceiling Load	831	-831	0	0
Ventilation Load	-139	0	-139	-5
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			45	2
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	3,394	-477	2,962	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	320	10
People	437	14
Misc	1,596	50
Sub Total ==>	2,353	74
Ceiling Load	930	29
Ventilation Load	-110	-3
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	3,173	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-438.01	17.13
Infiltration	0	0	0.00
Sub Total ==>	0	-438	17.13
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,301	0	0.00
Ventilation Load	110	110	-4.32
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-928	36.29
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-1,301	50.90
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,191	-2,557	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	75.1
Ra Plenum	84.5	51.6
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	151	151
Terminal	151	151
Main Fan	151	151
Sec Fan	0	0
Nom Vent	50	50
AHU Vent	50	50
Infil	0	0
MinStop/Rh	0	0
Return	201	201
Exhaust	50	50
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	33.1	33.1
cfm/ft²	0.60	0.60
cfm/ton	244.90	
ft²/ton	404.95	
Btu/hr·ft²	29.63	-9.62
No. People	2	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.3	3.0	2.6	151	74.3	61.8	63.4	55.0	54.5	63.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.4	4.5	2.6	50	96.4	76.5	107.1	50.0	49.9	53.9
Total	0.6	7.4								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	250		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.2	151	68.0	75.1
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-1.2	50	50.0	72.0
Total	-2.4			

Zone Checksums

By HDR

Zone - 003A

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 4 / 11
Outside Air: OADB/WB/HR: 70 / 58 / 55

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	47.48	47.48	0.81
Infiltration	0		0	0
Sub Total ==>	0	47	47	1
Internal Loads				
Lights	448	448	896	15
People	6,300	0	6,300	107
Misc	1,021	0	1,021	17
Sub Total ==>	7,769	448	8,217	139
Ceiling Load	1,163	-1,163	0	0
Ventilation Load	-2,455	0	-2,455	-42
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			86	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	6,478	-668	5,895	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	448	8
People	3,500	62
Misc	1,021	18
Sub Total ==>	4,969	88
Ceiling Load	1,303	23
Ventilation Load	-619	-11
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	5,653	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-613.21	8.74
Infiltration	0	0	0.00
Sub Total ==>	0	-613	8.74
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,822	0	0.00
Ventilation Load	619	619	-8.82
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-5,196	74.09
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-1,822	25.98
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,203	-7,012	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.3	71.8
Ra Plenum	84.5	51.6
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	290	290
Terminal	290	290
Main Fan	290	290
Sec Fan	0	0
Nom Vent	280	280
AHU Vent	280	280
Infil	0	0
MinStop/Rh	0	0
Return	570	570
Exhaust	280	280
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	96.7	96.7
cfm/ft²	0.83	0.83
cfm/ton	112.84	
ft²/ton	136.39	
Btu/hr·ft²	87.98	-22.88
No. People	14	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.5	5.9	4.9	290	74.3	61.8	63.4	56.3	54.9	62.5
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	2.1	24.9	14.3	280	96.4	76.5	107.1	50.0	49.9	53.9
Total	2.6	30.8								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	350		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.2	290	68.0	71.8
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-6.8	280	50.0	72.0
Total	-8.0			

Zone Checksums

By HDR

Zone - 004A

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 8 / 17
Outside Air: OADB/WB/HR: 89 / 73 / 96

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	1,957	597	2,554	51
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-26.00	-26.00	-0.52
Infiltration	0		0	0
Sub Total ==>	1,957	571	2,528	50
Internal Loads				
Lights	293	293	586	12
People	900	0	900	18
Misc	952	0	952	19
Sub Total ==>	2,145	293	2,438	48
Ceiling Load	833	-833	0	0
Ventilation Load	-3	0	-3	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			64	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	4,933	31	5,028	100.00

CLG SPACE PEAK

Mo/Hr: 10 / 17
OADB: 73

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	2,177	48
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	2,177	48
Internal Loads		
Lights	293	6
People	500	11
Misc	952	21
Sub Total ==>	1,745	38
Ceiling Load	733	16
Ventilation Load	-110	-2
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	4,545	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-627	-756	24.84
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-402.96	13.23
Infiltration	0	0	0.00
Sub Total ==>	-627	-1,159	38.07
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,197	0	0.00
Ventilation Load	110	110	-3.63
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-928	30.47
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-1,068	35.09
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,714	-3,045	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	75.2
Ra Plenum	85.4	51.6
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	217	217
Terminal	217	217
Main Fan	217	217
Sec Fan	0	0
Nom Vent	50	50
AHU Vent	50	50
Infil	0	0
MinStop/Rh	0	0
Return	267	267
Exhaust	50	50
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	23.1	23.1
cfm/ft²	0.94	0.94
cfm/ton	274.33	
ft²/ton	291.32	
Btu/hr·ft²	41.19	-12.74
No. People	2	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	0.4	5.0	4.5	217	74.3	61.8	63.4	55.0	53.8	60.6
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.4	4.5	2.6	50	96.4	76.5	107.1	50.0	49.9	53.9
Total	0.8	9.5								

AREAS

	Gross Total ft²	Glass ft²	Glass (%)
Floor	230		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	220	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.7	217	68.0	75.2
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-1.2	50	50.0	72.0
Total	-2.9			

Zone Checksums

By HDR

Zone - 004B

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 9 / 11
Outside Air: OADB/WB/HR: 79 / 64 / 69

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	3,428	0	3,428	19
Glass/Door Cond	36	0	36	0
Wall Cond	3,990	1,243	5,233	29
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	105.10	105.10	0.58
Infiltration	0		0	0
Sub Total ==>	7,454	1,348	8,802	49
Internal Loads				
Lights	1,148	1,148	2,295	13
People	3,150	0	3,150	17
Misc	4,605	0	4,605	25
Sub Total ==>	8,903	1,148	10,050	56
Ceiling Load	3,012	-3,012	0	0
Ventilation Load	-1,140	0	-1,140	-6
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			361	2
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	18,228	-516	18,074	100.00

CLG SPACE PEAK

Mo/Hr: 9 / 11
OADB: 79

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	3,428	19
Glass/Door Cond	36	0
Wall Cond	3,990	23
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	7,454	42
Internal Loads		
Lights	1,148	7
People	1,750	10
Misc	4,605	26
Sub Total ==>	7,503	42
Ceiling Load	3,076	17
Ventilation Load	-376	-2
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	17,657	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-636	-636	5.44
Wall Cond	-2,014	-2,456	21.01
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-1,576.82	13.49
Infiltration	0	0	0.00
Sub Total ==>	-2,650	-4,669	39.94
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-4,685	0	0.00
Ventilation Load	376	376	-3.21
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-3,154	26.98
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-4,243	36.29
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-6,959	-11,691	100.00

TEMPERATURES

	Cooling	Heating
SADB	60.9	73.2
Ra Plenum	84.6	51.6
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	1,220	1,220
Terminal	1,220	1,220
Main Fan	1,220	1,220
Sec Fan	0	0
Nom Vent	170	170
AHU Vent	170	170
Infil	0	0
MinStop/Rh	0	0
Return	1,390	1,390
Exhaust	170	170
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	13.9	13.9
cfm/ft²	1.36	1.36
cfm/ton	440.98	
ft²/ton	325.39	
Btu/hr·ft²	36.88	-12.32
No. People	7	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB/WB/HR °F	Enter DB/WB/HR °F	Enter DB/WB/HR gr/lb	Leave DB/WB/HR °F	Leave DB/WB/HR °F	Leave DB/WB/HR gr/lb
Main Clg	1.5	18.1	17.4	1,220	74.3	61.8	63.4	60.9	56.8	63.3
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	1.3	15.1	8.7	170	96.4	76.5	107.1	50.0	49.9	53.9
Total	2.8	33.2								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	900		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	753	36	5
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-7.0	1,220	68.0	73.2
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-4.1	170	50.0	72.0
Total	-11.1			

Zone Checksums

By HDR

Zone - 005A

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 8 / 11
Outside Air: OADB/WB/HR: 84 / 71 / 95

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	2,535	0	2,535	23
Glass/Door Cond	128	0	128	1
Wall Cond	4,151	1,335	5,486	49
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-2.88	-2.88	-0.03
Infiltration	0		0	0
Sub Total ==>	6,814	1,332	8,146	73
Internal Loads				
Lights	584	584	1,167	10
People	900	0	900	8
Misc	952	0	952	9
Sub Total ==>	2,436	584	3,019	27
Ceiling Load	1,486	-1,486	0	0
Ventilation Load	-185	0	-185	-2
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			137	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	10,551	430	11,118	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 11
OADB: 88

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	2,540	26
Glass/Door Cond	81	1
Wall Cond	4,284	44
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	6,905	70
Internal Loads		
Lights	586	6
People	473	5
Misc	957	10
Sub Total ==>	2,016	20
Ceiling Load	1,472	15
Ventilation Load	-552	-6
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	9,841	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-636	-636	7.90
Wall Cond	-1,781	-2,175	27.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-802.43	9.96
Infiltration	0	0	0.00
Sub Total ==>	-2,417	-3,613	44.86
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-2,384	0	0.00
Ventilation Load	331	331	-4.11
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-2,783	34.55
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-1,990	24.70
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-4,470	-8,056	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	76.7
Ra Plenum	85.0	51.6
Return	74.5	68.0
Ret/OA	74.2	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	463	463
Terminal	463	463
Main Fan	463	463
Sec Fan	0	0
Nom Vent	150	150
AHU Vent	150	150
Infil	0	0
MinStop/Rh	0	0
Return	613	613
Exhaust	150	150
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	32.4	32.4
cfm/ft²	1.01	1.01
cfm/ton	227.24	
ft²/ton	224.72	
Btu/hr·ft²	53.40	-17.72
No. People	2	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.9	11.1	10.4	463	74.8	62.2	64.5	55.0	54.0	61.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	1.1	13.3	7.7	150	96.4	76.5	107.1	50.0	49.9	53.9
Total	2.0	24.5								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	458		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	671	36	5
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-4.5	463	68.0	76.7
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-3.6	150	50.0	72.0
Total	-8.1			

Zone Checksums

By HDR

Zone - 006A

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 17
Outside Air: OADB/WB/HR: 94 / 75 / 105

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	393	0	393	13
Glass Solar	0	0	0	0
Glass/Door Cond	115	0	115	4
Wall Cond	1,546	0	1,546	50
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	550		550	18
Sub Total ==>	2,603	0	2,603	85
Internal Loads				
Lights	459	0	459	15
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	459	0	459	15
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			9	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	3,062	0	3,071	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	393	14
Glass Solar	0	0
Glass/Door Cond	115	4
Wall Cond	1,546	56
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	244	9
Sub Total ==>	2,298	83
Internal Loads		
Lights	459	17
People	0	0
Misc	0	0
Sub Total ==>	459	17
Ceiling Load	0	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	2,757	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	-145	-145	8.58
Glass Solar	0	0	0.00
Glass/Door Cond	-228	-228	13.51
Wall Cond	-788	-788	46.67
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	0.00	0.00
Infiltration	-527	-527	31.24
Sub Total ==>	-1,688	-1,688	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	0	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,688	-1,688	100.00

TEMPERATURES

	Cooling	Heating
SADB	64.1	64.8
Ra Plenum	80.0	55.0
Return	80.0	55.0
Ret/OA	80.0	55.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	157	157
Terminal	157	157
Main Fan	157	157
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	16	16
MinStop/Rh	0	0
Return	173	173
Exhaust	16	16
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.87	0.87
cfm/ton	611.68	
ft²/ton	703.29	
Btu/hr·ft²	17.06	-9.38
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	0.3	3.1	2.8	157	80.1	66.6	77.5	64.1	60.7	74.8
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.3	3.1								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	180		
Part	0		
Int Door	0		
ExFlr	0		
Roof	180	0	0
Wall	297	0	0
Ext Door	21	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.7	157	55.0	64.8
Aux Htg	0.0	0	0.0	0.0
Preheat	-1.6	157	55.0	64.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-1.7			

Zone Checksums

By HDR

Zone - 007A

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 6 / 11
Outside Air: OADB/WB/HR: 86 / 69 / 83

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	892	265	1,157	16
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-10.16	-10.16	-0.14
Infiltration	0		0	0
Sub Total ==>	892	255	1,147	15
Internal Loads				
Lights	140	140	280	4
People	0	0	0	0
Misc	6,000	0	6,000	81
Sub Total ==>	6,140	140	6,280	84
Ceiling Load	395	-395	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			21	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	7,428	0	7,448	100.00

CLG SPACE PEAK

Mo/Hr: 6 / 11
OADB: 86

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	892	12
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	892	12
Internal Loads		
Lights	140	2
People	0	0
Misc	6,000	81
Sub Total ==>	6,140	83
Ceiling Load	395	5
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	7,428	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-360	-447	32.98
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-581.06	42.90
Infiltration	0	0	0.00
Sub Total ==>	-360	-1,028	75.88
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-413	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-327	24.12
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-773	-1,354	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	70.0
Ra Plenum	85.4	56.1
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	354	354
Terminal	354	354
Main Fan	354	354
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	0	0
Return	354	354
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	3.22	3.22
cfm/ton	570.21	
ft²/ton	177.22	
Btu/hr·ft²	67.71	-7.03
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	0.6	7.5	7.5	354	74.1	56.6	41.4	55.0	48.6	41.1
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.6	7.5								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	110		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	126	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.8	354	68.0	70.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-0.8			

Zone Checksums

By HDR

100 VESTIBULE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 0 / 0
Outside Air: OADB/WB/HR: 0 / 0 / 0

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	0		0	0
Sub Total ==>	0	0	0	0
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	0	0	0	100.00

CLG SPACE PEAK

Mo/Hr: 0 / 0
OADB: 0

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load		0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	0	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-80	3.93
Glass Solar	0	0	0.00
Glass/Door Cond	-751	-751	37.06
Wall Cond	-766	-1,000	49.36
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	0.00	0.00
Infiltration	-196	-196	9.66
Sub Total ==>	-1,713	-2,027	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-314	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-2,027	-2,027	100.00

TEMPERATURES

	Cooling	Heating
SADB	0.0	125.0
Ra Plenum	0.0	57.2
Return	0.0	68.0
Ret/OA	0.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	32
Terminal	0	32
Main Fan	0	32
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	4
MinStop/Rh	0	0
Return	0	36
Exhaust	0	4
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.00	0.35
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	-22.03
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	92		
Part	0		
Int Door	0		
ExFlr	0		
Roof	92	0	0
Wall	303	20	7
Ext Door	26	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.0	32	68.0	125.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.0			

Zone Checksums

By HDR

109 VESTIBULE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 0 / 0
Outside Air: OADB/WB/HR: 0 / 0 / 0

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	0		0	0
Sub Total ==>	0	0	0	0
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	0	0	0	100.00

CLG SPACE PEAK

Mo/Hr: 0 / 0
OADB: 0

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load	0	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	0	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-751	-751	28.40
Wall Cond	-598	-778	29.40
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-548.99	20.76
Infiltration	-255	-255	9.65
Sub Total ==>	-1,604	-2,333	88.20
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-492	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-312	11.80
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-2,096	-2,645	100.00

TEMPERATURES

	Cooling	Heating
SADB	0.0	125.0
Ra Plenum	0.0	55.1
Return	0.0	68.0
Ret/OA	0.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	33
Terminal	0	33
Main Fan	0	33
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	5
MinStop/Rh	0	0
Return	0	39
Exhaust	0	5
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.00	0.28
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	-17.47
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	120		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	245	20	8
Ext Door	26	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.1	33	68.0	125.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.1			

Zone Checksums

By HDR

ATTIC

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 16
Outside Air: OADB/WB/HR: 95 / 76 / 107

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	9,998	9,998	53
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	7,601	100	7,701	41
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	1,204.05	0.00	1,204.05	6.37
Infiltration	0		0	0
Sub Total ==>	8,805	10,098	18,902	100
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	1,411	-1,411	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	10,215	8,687	18,902	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	8,820	81
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	985.03	9.06
Infiltration	0	0
Sub Total ==>	9,805	90
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load	1,072	10
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	10,878	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-4,037	-25.19
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-2,510	-2,553	-15.92
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	8,521.95	8,521.95	53.16
Infiltration	0	0	0.00
Sub Total ==>	6,012	1,932	12.05
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	10,019	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		14,099	87.95
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	16,031	16,031	100.00

TEMPERATURES

	Cooling	Heating
SADB	85.0	45.0
Ra Plenum	86.0	51.7
Return	86.0	51.7
Ret/OA	86.0	51.7
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	0
Terminal	0	0
Main Fan	0	0
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	0	0
Return	0	0
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.00	0.00
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	0.00
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	4,710		
Part	0		
Int Door	0		
ExFlr	4,723		
Roof	4,745	0	0
Wall	1,152	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	0.0	0	0.0	0.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	0.0			

Zone Checksums

By HDR

Zone - 001A

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 17
Outside Air: OADB/WB/HR: 94 / 75 / 105

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	1,493	0	1,493	9
Glass/Door Cond	312	0	312	2
Wall Cond	4,482	1,438	5,920	34
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-215.46	-215.46	-1.23
Infiltration	1,969		1,969	11
Sub Total ==>	8,256	1,222	9,478	54
Internal Loads				
Lights	1,439	1,439	2,878	16
People	5,400	0	5,400	31
Misc	1,596	0	1,596	9
Sub Total ==>	8,435	1,439	9,874	56
Ceiling Load	4,177	-4,177	0	0
Ventilation Load	-2,088	0	-2,088	-12
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			288	2
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	18,780	-1,516	17,552	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	1,493	9
Glass/Door Cond	312	2
Wall Cond	4,920	29
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	846	5
Sub Total ==>	7,571	44
Internal Loads		
Lights	1,408	8
People	3,000	17
Misc	1,596	9
Sub Total ==>	6,004	35
Ceiling Load	4,114	24
Ventilation Load	-530	-3
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	17,158	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-636	-636	2.64
Wall Cond	-1,772	-2,167	8.99
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-2,013.47	8.36
Infiltration	-1,829	-1,829	7.59
Sub Total ==>	-4,238	-6,646	27.58
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-5,806	0	0.00
Ventilation Load	530	530	-2.20
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-8,118	-8,118	33.69
Exhaust Heat		0	0.00
OA Preheat Diff.		-4,453	18.48
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-5,411	22.46
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-17,631	-24,098	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.0	84.4
Ra Plenum	85.7	51.7
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	972	972
Terminal	972	972
Main Fan	972	972
Sec Fan	0	0
Nom Vent	240	240
AHU Vent	240	240
Infil	39	39
MinStop/Rh	97	97
Return	1,251	1,251
Exhaust	279	279
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	24.7	24.7
cfm/ft²	0.86	0.86
cfm/ton	299.85	
ft²/ton	347.10	
Btu/hr·ft²	34.57	-20.86
No. People	12	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB/WB/HR °F	Enter DB/WB/HR °F	Enter DB/WB/HR gr/lb	Leave DB/WB/HR °F	Leave DB/WB/HR °F	Leave DB/WB/HR gr/lb
Main Clg	1.5	17.6	15.6	972	74.3	61.8	63.4	58.0	55.7	63.2
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	1.8	21.3	12.3	240	96.4	76.5	107.1	50.0	49.9	53.9
Total	3.2	38.9								

AREAS

	Gross Total ft²	Glass ft²	Glass (%)
Floor	1,125		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	668	36	5
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-17.6	972	68.0	84.4
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-5.8	240	50.0	72.0
Total	-23.5			

Zone Checksums

By HDR

Zone - 002A

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 11
Outside Air: OADB/WB/HR: 88 / 72 / 97

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	499	0	499	7
Glass/Door Cond	257	0	257	4
Wall Cond	2,437	822	3,259	47
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-53.97	-53.97	-0.78
Infiltration	1,235		1,235	18
Sub Total ==>	4,427	768	5,195	75
Internal Loads				
Lights	979	979	1,958	28
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	979	979	1,958	28
Ceiling Load	2,623	-2,623	0	0
Ventilation Load	-485	0	-485	-7
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	34		34	0
Exhaust Heat		144	144	2
Sup. Fan Heat			100	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	7,578	-731	6,947	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 11
OADB: 88

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	499	7
Glass/Door Cond	257	4
Wall Cond	2,437	34
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	413	6
Sub Total ==>	3,605	50
Internal Loads		
Lights	982	14
People	0	0
Misc	0	0
Sub Total ==>	982	14
Ceiling Load	2,646	37
Ventilation Load	-442	-6
Adj Air Trans Heat	0	0
Ov/Undr Sizing	355	5
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	7,146	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-860	-860	7.53
Wall Cond	-1,212	-1,504	13.16
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-1,369.16	11.98
Infiltration	-1,308	-1,308	11.45
Sub Total ==>	-3,381	-5,042	44.11
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-3,948	0	0.00
Ventilation Load	221	221	-1.93
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-1,097	-1,097	9.60
Exhaust Heat		0	0.00
OA Preheat Diff.		-1,856	16.23
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-3,656	31.99
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-8,205	-11,430	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	90.0
Ra Plenum	85.3	51.7
Return	74.6	68.0
Ret/OA	74.6	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	338	338
Terminal	338	338
Main Fan	338	338
Sec Fan	0	0
Nom Vent	100	100
AHU Vent	100	100
Infil	28	28
MinStop/Rh	34	34
Return	465	465
Exhaust	128	128
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	29.6	29.6
cfm/ft²	0.44	0.44
cfm/ton	255.83	
ft²/ton	579.58	
Btu/hr·ft²	20.70	-13.90
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.6	7.0	6.2	338	74.8	62.2	64.4	55.0	54.8	64.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.7	8.9	5.1	100	96.4	76.5	107.1	50.0	49.9	53.9
Total	1.3	15.8								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	765		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	462	20	4
Ext Door	33	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-8.2	338	68.0	90.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-2.4	100	50.0	72.0
Total	-10.6			

Zone Checksums

By HDR

Zone - 002B

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 4 / 11
Outside Air: OADB/WB/HR: 70 / 58 / 55

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	63.33	63.33	1.79
Infiltration	0		0	0
Sub Total ==>	0	63	63	2
Internal Loads				
Lights	531	531	1,062	30
People	900	0	900	25
Misc	1,596	0	1,596	45
Sub Total ==>	3,027	531	3,558	100
Ceiling Load	1,371	-1,371	0	0
Ventilation Load	-136	0	-136	-4
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			57	2
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
***Grand Total* ==>**	4,261	-777	3,542	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	531	13
People	500	12
Misc	1,596	39
Sub Total ==>	2,627	65
Ceiling Load	1,541	38
Ventilation Load	-110	-3
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
***Grand Total* ==>**	4,057	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-742.75	20.06
Infiltration	0	0	0.00
Sub Total ==>	0	-743	20.06
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-2,142	0	0.00
Ventilation Load	110	110	-2.98
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-928	25.06
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-2,142	57.86
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
***Grand Total* ==>**	-2,031	-3,702	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	77.5
Ra Plenum	84.4	51.7
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	193	193
Terminal	193	193
Main Fan	193	193
Sec Fan	0	0
Nom Vent	50	50
AHU Vent	50	50
Infil	0	0
MinStop/Rh	19	19
Return	243	243
Exhaust	50	50
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	25.9	25.9
cfm/ft²	0.47	0.47
cfm/ton	290.44	
ft²/ton	623.41	
Btu/hr·ft²	19.25	-7.82
No. People	2	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.3	3.5	3.2	193	74.3	61.8	63.4	55.0	54.5	63.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.4	4.5	2.6	50	96.4	76.5	107.1	50.0	49.9	53.9
Total	0.7	8.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	415		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.0	193	68.0	77.5
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-1.2	50	50.0	72.0
Total	-3.3			

Zone Checksums

By HDR

Zone - 002C

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 4 / 11
Outside Air: OADB/WB/HR: 70 / 58 / 55

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	38.15	38.15	1.28
Infiltration	0		0	0
Sub Total ==>	0	38	38	1
Internal Loads				
Lights	320	320	640	22
People	787	0	787	26
Misc	1,596	0	1,596	54
Sub Total ==>	2,702	320	3,022	102
Ceiling Load	826	-826	0	0
Ventilation Load	-135	0	-135	-5
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			45	2
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	3,393	-468	2,970	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	320	10
People	437	14
Misc	1,596	50
Sub Total ==>	2,353	74
Ceiling Load	928	29
Ventilation Load	-110	-3
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	3,170	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-447.44	17.51
Infiltration	0	0	0.00
Sub Total ==>	0	-447	17.51
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,290	0	0.00
Ventilation Load	110	110	-4.32
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-928	36.31
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-1,290	50.50
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,180	-2,555	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	75.1
Ra Plenum	84.4	51.7
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	151	151
Terminal	151	151
Main Fan	151	151
Sec Fan	0	0
Nom Vent	50	50
AHU Vent	50	50
Infil	0	0
MinStop/Rh	15	15
Return	201	201
Exhaust	50	50
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	33.1	33.1
cfm/ft²	0.60	0.60
cfm/ton	244.48	
ft²/ton	404.53	
Btu/hr·ft²	29.66	-9.58
No. People	2	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.3	3.0	2.7	151	74.3	61.8	63.4	55.0	54.5	63.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.4	4.5	2.6	50	96.4	76.5	107.1	50.0	49.9	53.9
Total	0.6	7.4								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	250		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.2	151	68.0	75.1
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-1.2	50	50.0	72.0
Total	-2.4			

Zone Checksums

By HDR

Zone - 003A

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 4 / 11
Outside Air: OADB/WB/HR: 70 / 58 / 55

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	53.41	53.41	0.90
Infiltration	0		0	0
Sub Total ==>	0	53	53	1
Internal Loads				
Lights	448	448	896	15
People	6,300	0	6,300	106
Misc	1,021	0	1,021	17
Sub Total ==>	7,769	448	8,217	139
Ceiling Load	1,156	-1,156	0	0
Ventilation Load	-2,438	0	-2,438	-41
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			86	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	6,487	-655	5,918	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	448	8
People	3,500	62
Misc	1,021	18
Sub Total ==>	4,969	88
Ceiling Load	1,300	23
Ventilation Load	-619	-11
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	5,650	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-626.41	8.94
Infiltration	0	0	0.00
Sub Total ==>	0	-626	8.94
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,806	0	0.00
Ventilation Load	619	619	-8.82
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-5,196	74.12
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-1,806	25.77
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,188	-7,010	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.3	71.7
Ra Plenum	84.4	51.7
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	289	289
Terminal	289	289
Main Fan	289	289
Sec Fan	0	0
Nom Vent	280	280
AHU Vent	280	280
Infil	0	0
MinStop/Rh	29	29
Return	569	569
Exhaust	280	280
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	96.8	96.8
cfm/ft²	0.83	0.83
cfm/ton	112.68	
ft²/ton	136.29	
Btu/hr·ft²	88.05	-22.83
No. People	14	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.5	5.9	4.9	289	74.3	61.8	63.4	56.3	54.8	62.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	2.1	24.9	14.3	280	96.4	76.5	107.1	50.0	49.9	53.9
Total	2.6	30.8								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	350		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.2	289	68.0	71.7
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-6.8	280	50.0	72.0
Total	-8.0			

Zone Checksums

By HDR

Zone - 004A

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 8 / 17
Outside Air: OADB/WB/HR: 89 / 73 / 96

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	1,957	597	2,554	51
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-23.70	-23.70	-0.47
Infiltration	0		0	0
Sub Total ==>	1,957	573	2,531	50
Internal Loads				
Lights	293	293	586	12
People	900	0	900	18
Misc	952	0	952	19
Sub Total ==>	2,145	293	2,438	48
Ceiling Load	830	-830	0	0
Ventilation Load	-3	0	-3	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			64	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	4,930	36	5,030	100.00

CLG SPACE PEAK

Mo/Hr: 10 / 17
OADB: 73

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	2,177	48
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	2,177	48
Internal Loads		
Lights	293	6
People	500	11
Misc	952	21
Sub Total ==>	1,745	38
Ceiling Load	728	16
Ventilation Load	-110	-2
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	4,540	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-627	-757	24.87
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-411.64	13.53
Infiltration	0	0	0.00
Sub Total ==>	-627	-1,169	38.40
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,187	0	0.00
Ventilation Load	110	110	-3.63
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-928	30.49
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-1,057	34.74
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,704	-3,043	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	75.1
Ra Plenum	85.4	51.7
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	216	216
Terminal	216	216
Main Fan	216	216
Sec Fan	0	0
Nom Vent	50	50
AHU Vent	50	50
Infil	0	0
MinStop/Rh	22	22
Return	266	266
Exhaust	50	50
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	23.1	23.1
cfm/ft²	0.94	0.94
cfm/ton	273.92	
ft²/ton	291.24	
Btu/hr·ft²	41.20	-12.69
No. People	2	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.4	5.0	4.5	216	74.3	61.8	63.4	55.0	53.8	60.5
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.4	4.5	2.6	50	96.4	76.5	107.1	50.0	49.9	53.9
Total	0.8	9.5								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	230		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	220	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.7	216	68.0	75.1
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-1.2	50	50.0	72.0
Total	-2.9			

Zone Checksums

By HDR

Zone - 004B

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 9 / 11
Outside Air: OADB/WB/HR: 79 / 64 / 69

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	2,086	0	2,086	12
Glass/Door Cond	36	0	36	0
Wall Cond	3,990	1,245	5,234	30
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	120.63	120.63	0.69
Infiltration	0		0	0
Sub Total ==>	6,113	1,365	7,478	43
Internal Loads				
Lights	1,148	1,148	2,295	13
People	3,150	0	3,150	18
Misc	4,605	0	4,605	26
Sub Total ==>	8,903	1,148	10,050	58
Ceiling Load	2,994	-2,994	0	0
Ventilation Load	-328	0	-328	-2
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			231	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	17,681	-481	17,431	100.00

CLG SPACE PEAK

Mo/Hr: 8 / 12
OADB: 87

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	1,562	10
Glass/Door Cond	169	1
Wall Cond	4,347	27
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	6,078	37
Internal Loads		
Lights	1,156	7
People	1,590	10
Misc	4,649	28
Sub Total ==>	7,395	45
Ceiling Load	3,291	20
Ventilation Load	-376	-2
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	16,388	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-636	-636	4.88
Wall Cond	-2,014	-2,458	18.86
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-1,610.78	12.36
Infiltration	0	0	0.00
Sub Total ==>	-2,650	-4,705	36.09
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-4,645	0	0.00
Ventilation Load	376	376	-2.88
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-1,353	-1,353	10.38
Exhaust Heat		0	0.00
OA Preheat Diff.		-3,154	24.20
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-4,200	32.22
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-8,272	-13,037	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	77.6
Ra Plenum	84.5	51.7
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	781	781
Terminal	781	781
Main Fan	781	781
Sec Fan	0	0
Nom Vent	170	170
AHU Vent	170	170
Infil	0	0
MinStop/Rh	78	78
Return	951	951
Exhaust	170	170
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	21.8	21.8
cfm/ft²	0.87	0.87
cfm/ton	287.93	
ft²/ton	331.81	
Btu/hr·ft²	36.17	-13.78
No. People	7	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB/WB/HR °F	Enter DB/WB/HR °F	Enter DB/WB/HR gr/lb	Leave DB/WB/HR °F	Leave DB/WB/HR °F	Leave DB/WB/HR gr/lb
Main Clg	1.5	17.4	16.0	781	74.3	61.8	63.4	55.0	54.1	61.8
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	1.3	15.1	8.7	170	96.4	76.5	107.1	50.0	49.9	53.9
Total	2.7	32.6								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	900		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	753	36	5
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-8.3	781	68.0	77.6
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-4.1	170	50.0	72.0
Total	-12.4			

Zone Checksums

By HDR

Zone - 005A

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 8 / 11
Outside Air: OADB/WB/HR: 84 / 71 / 95

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	1,445	0	1,445	15
Glass/Door Cond	120	0	120	1
Wall Cond	3,873	1,237	5,110	53
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.50	0.50	0.01
Infiltration	0		0	0
Sub Total ==>	5,438	1,237	6,675	69
Internal Loads				
Lights	584	584	1,167	12
People	900	0	900	9
Misc	952	0	952	10
Sub Total ==>	2,436	584	3,019	31
Ceiling Load	1,481	-1,481	0	0
Ventilation Load	-261	0	-261	-3
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		130	130	1
Sup. Fan Heat			123	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	9,094	470	9,687	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 11
OADB: 88

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	1,546	17
Glass/Door Cond	81	1
Wall Cond	4,284	48
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	5,911	67
Internal Loads		
Lights	586	7
People	473	5
Misc	957	11
Sub Total ==>	2,016	23
Ceiling Load	1,464	17
Ventilation Load	-552	-6
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	8,838	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-636	-636	4.84
Wall Cond	-1,781	-2,177	16.56
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-554.43	4.22
Infiltration	0	0	0.00
Sub Total ==>	-2,417	-3,368	25.61
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-2,364	0	0.00
Ventilation Load	331	331	-2.52
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-5,361	-5,361	40.77
Exhaust Heat		0	0.00
OA Preheat Diff.		-2,783	21.17
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-1,967	14.96
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-9,810	-13,148	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	89.4
Ra Plenum	85.0	51.7
Return	74.6	68.0
Ret/OA	74.6	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	415	415
Terminal	415	415
Main Fan	415	415
Sec Fan	0	0
Nom Vent	150	150
AHU Vent	150	150
Infil	0	0
MinStop/Rh	42	42
Return	565	565
Exhaust	150	150
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	36.1	36.1
cfm/ft²	0.91	0.91
cfm/ton	216.47	
ft²/ton	238.69	
Btu/hr·ft²	50.27	-29.38
No. People	2	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB/WB/HR °F	Enter DB/WB/HR °F	Enter DB/WB/HR gr/lb	Leave DB/WB/HR °F	Leave DB/WB/HR °F	Leave DB/WB/HR gr/lb
Main Clg	0.8	9.7	9.0	415	74.8	62.4	65.2	55.0	54.5	63.1
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	1.1	13.3	7.7	150	96.4	76.5	107.1	50.0	49.9	53.9
Total	1.9	23.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	458		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	671	36	5
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-9.8	415	68.0	89.4
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-3.6	150	50.0	72.0
Total	-13.5			

Zone Checksums

By HDR

Zone - 006A

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 17
Outside Air: OADB/WB/HR: 94 / 75 / 105

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	365	365	12
Glass Solar	0	0	0	0
Glass/Door Cond	115	0	115	4
Wall Cond	1,537	8	1,545	50
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	552		552	18
Sub Total ==>	2,204	373	2,577	84
Internal Loads				
Lights	459	0	459	15
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	459	0	459	15
Ceiling Load	326	-326	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			46	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	2,989	47	3,082	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 12
OADB: 91

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	70	3
Wall Cond	1,661	61
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	194	7
Sub Total ==>	1,925	71
Internal Loads		
Lights	463	17
People	0	0
Misc	0	0
Sub Total ==>	463	17
Ceiling Load	328	12
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	2,716	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-129	7.48
Glass Solar	0	0	0.00
Glass/Door Cond	-228	-228	13.24
Wall Cond	-783	-787	45.69
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	0.00	0.00
Infiltration	-524	-524	30.43
Sub Total ==>	-1,535	-1,668	96.84
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-187	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-54	3.16
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,723	-1,723	100.00

TEMPERATURES

	Cooling	Heating
SADB	64.1	65.1
Ra Plenum	85.7	51.7
Return	80.0	55.0
Ret/OA	80.0	55.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	155	155
Terminal	155	155
Main Fan	155	155
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	16	16
MinStop/Rh	15	15
Return	170	170
Exhaust	16	16
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.86	0.86
cfm/ton	601.84	
ft²/ton	700.91	
Btu/hr·ft²	17.12	-9.57
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.3	3.1	2.8	155	80.3	66.7	77.5	64.1	60.7	74.6
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.3	3.1								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	180		
Part	0		
Int Door	0		
ExFlr	0		
Roof	180	0	0
Wall	297	0	0
Ext Door	21	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.7	155	55.0	65.1
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-1.7			

Zone Checksums

By HDR

Zone - 007A

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 6 / 11
Outside Air: OADB/WB/HR: 86 / 69 / 83

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	892	266	1,158	15
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-7.70	-7.70	-0.10
Infiltration	0		0	0
Sub Total ==>	892	258	1,150	15
Internal Loads				
Lights	140	140	280	4
People	0	0	0	0
Misc	6,000	0	6,000	80
Sub Total ==>	6,140	140	6,280	83
Ceiling Load	393	-393	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			105	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	7,425	6	7,535	100.00

CLG SPACE PEAK

Mo/Hr: 6 / 11
OADB: 86

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	892	12
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	892	12
Internal Loads		
Lights	140	2
People	0	0
Misc	6,000	81
Sub Total ==>	6,140	83
Ceiling Load	393	5
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	7,425	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-360	-434	38.62
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-196.87	17.51
Infiltration	0	0	0.00
Sub Total ==>	-360	-631	56.13
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-568	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-493	43.87
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-928	-1,125	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	70.4
Ra Plenum	85.3	51.7
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	354	354
Terminal	354	354
Main Fan	354	354
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	35	35
Return	354	354
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	3.22	3.22
cfm/ton	563.44	
ft²/ton	175.18	
Btu/hr·ft²	68.50	-8.43
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	0.6	7.5	7.5	354	74.3	61.8	63.4	55.0	54.5	63.3
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.6	7.5								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	110		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	126	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.9	354	68.0	70.4
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-0.9			

Zone Checksums

By HDR

100 VESTIBULE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 0 / 0
Outside Air: OADB/WB/HR: 0 / 0 / 0

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	0		0	0
Sub Total ==>	0	0	0	0
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	0	0	0	100.00

CLG SPACE PEAK

Mo/Hr: 0 / 0
OADB: 0

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load	0	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	0	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-80	3.93
Glass Solar	0	0	0.00
Glass/Door Cond	-751	-751	37.06
Wall Cond	-766	-1,000	49.36
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	0.00	0.00
Infiltration	-196	-196	9.66
Sub Total ==>	-1,713	-2,027	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-314	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-2,027	-2,027	100.00

TEMPERATURES

	Cooling	Heating
SADB	0.0	125.0
Ra Plenum	0.0	57.2
Return	0.0	68.0
Ret/OA	0.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	32
Terminal	0	32
Main Fan	0	32
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	4
MinStop/Rh	0	0
Return	0	36
Exhaust	0	4
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.00	0.35
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	-22.03
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	92		
Part	0		
Int Door	0		
ExFlr	0		
Roof	92	0	0
Wall	303	20	7
Ext Door	26	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.0	32	68.0	125.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.0			

Zone Checksums

By HDR

109 VESTIBULE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 0 / 0
Outside Air: OADB/WB/HR: 0 / 0 / 0

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	0		0	0
Sub Total ==>	0	0	0	0
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	0	0	0	100.00

CLG SPACE PEAK

Mo/Hr: 0 / 0
OADB: 0

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load	0	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	0	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-751	-751	28.50
Wall Cond	-598	-779	29.55
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-548.99	20.83
Infiltration	-255	-255	9.69
Sub Total ==>	-1,604	-2,334	88.56
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-482	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-301	11.44
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-2,087	-2,636	100.00

TEMPERATURES

	Cooling	Heating
SADB	0.0	125.0
Ra Plenum	0.0	55.3
Return	0.0	68.0
Ret/OA	0.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	33
Terminal	0	33
Main Fan	0	33
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	5
MinStop/Rh	0	0
Return	0	39
Exhaust	0	5
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.00	0.28
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	-17.39
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	120		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	245	20	8
Ext Door	26	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.1	33	68.0	125.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.1			

Zone Checksums

By HDR

ATTIC

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 16
Outside Air: OADB/WB/HR: 95 / 76 / 107

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	9,991	9,991	53
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	7,601	100	7,701	41
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	1,103.05	0.00	1,103.05	5.87
Infiltration	0		0	0
Sub Total ==>	8,704	10,091	18,795	100
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	1,487	-1,487	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	10,191	8,604	18,795	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	8,820	81
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	901.73	8.30
Infiltration	0	0
Sub Total ==>	9,722	90
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load	1,140	10
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	10,862	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-4,040	-25.25
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-2,510	-2,553	-15.95
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	8,462.38	8,462.38	52.88
Infiltration	0	0	0.00
Sub Total ==>	5,952	1,870	11.68
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	10,050	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		14,132	88.32
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	16,002	16,002	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.5	45.0
Ra Plenum	86.0	51.7
Return	86.0	51.7
Ret/OA	87.2	25.2
Fn MtrTD	0.2	0.0
Fn BldTD	0.5	0.0
Fn Frict	1.5	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	0
Terminal	0	0
Main Fan	0	0
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	0	0
Return	0	0
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	12.7	0.0
cfm/ft²	0.00	0.00
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	0.00
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	4,710		
Part	0		
Int Door	0		
ExFlr	4,723		
Roof	4,745	0	0
Wall	1,152	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	0.0	0	0.0	0.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	48.4	56.3
Reheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	0.0			

Zone Checksums

By HDR

Zone - 001A

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 17
Outside Air: OADB/WB/HR: 94 / 75 / 105

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	1,493	0	1,493	5
Glass/Door Cond	312	0	312	1
Wall Cond	4,482	1,437	5,919	18
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-218.24	-218.24	-0.67
Infiltration	1,944		1,944	6
Sub Total ==>	8,231	1,219	9,450	29
Internal Loads				
Lights	1,439	1,439	2,878	9
People	5,400	0	5,400	17
Misc	1,596	0	1,596	5
Sub Total ==>	8,435	1,439	9,874	30
Ceiling Load	4,193	-4,193	0	0
Ventilation Load	0	0	8,764	27
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	1,671		1,671	5
Exhaust Heat		0	0	0
Sup. Fan Heat			2,628	8
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	22,530	-1,535	32,386	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	1,493	8
Glass/Door Cond	312	2
Wall Cond	4,482	24
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	846	4
Sub Total ==>	7,133	37
Internal Loads		
Lights	1,439	8
People	3,000	16
Misc	1,596	8
Sub Total ==>	6,035	32
Ceiling Load	4,193	22
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	1,671	9
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	19,032	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-636	-636	2.73
Wall Cond	-1,772	-2,167	9.31
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-1,924.28	8.26
Infiltration	-1,829	-1,829	7.86
Sub Total ==>	-4,238	-6,557	28.16
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-5,798	0	0.00
Ventilation Load	0	-7,769	33.36
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-347	1.49
RA Preheat Diff.		-3,211	13.79
Additional Reheat		0	0.00
System Plenum Heat		-5,404	23.20
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-10,036	-23,287	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.5	90.0
Ra Plenum	85.8	51.7
Return	74.0	68.0
Ret/OA	77.1	51.0
Fn MtrTD	0.2	0.0
Fn BldTD	0.5	0.0
Fn Frict	1.5	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	1,109	413
Terminal	1,109	413
Main Fan	1,109	413
Sec Fan	0	0
Nom Vent	174	164
AHU Vent	174	164
Infil	39	39
MinStop/Rh	413	413
Return	1,147	452
Exhaust	213	203
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	15.7	39.8
cfm/ft²	0.99	0.37
cfm/ton	410.73	
ft²/ton	416.84	
Btu/hr·ft²	28.79	-18.99
No. People	12	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	2.7	32.4	23.9	1,109	77.1	64.3	70.6	56.3	54.6	61.7
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	2.7	32.4								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	1,125		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	668	36	5
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-15.4	413	56.3	90.0
Aux Htg	0.0	0	0.0	0.0
Preheat	-6.0	174	25.2	56.3
Reheat	-5.3	413	56.3	68.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-21.4			

Zone Checksums

By HDR

Zone - 002A

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 12
Outside Air: OADB/WB/HR: 91 / 75 / 104

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	426	0	426	2
Glass/Door Cond	331	0	331	1
Wall Cond	2,193	722	2,915	13
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-164.70	-164.70	-0.72
Infiltration	1,278		1,278	6
Sub Total ==>	4,228	557	4,785	21
Internal Loads				
Lights	992	992	1,984	9
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	992	992	1,984	9
Ceiling Load	2,754	-2,754	0	0
Ventilation Load	0	0	5,640	25
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	8,412		8,412	37
Exhaust Heat		-19	-19	0
Sup. Fan Heat			2,130	9
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	16,387	-1,224	22,932	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 12
OADB: 91

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	426	3
Glass/Door Cond	331	2
Wall Cond	2,193	14
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	520	3
Sub Total ==>	3,470	22
Internal Loads		
Lights	992	6
People	0	0
Misc	0	0
Sub Total ==>	992	6
Ceiling Load	2,754	18
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	8,300	53
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	15,516	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-860	-860	5.05
Wall Cond	-1,212	-1,504	8.83
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-1,373.35	8.06
Infiltration	-1,308	-1,308	7.68
Sub Total ==>	-3,381	-5,046	29.63
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-3,943	0	0.00
Ventilation Load	0	-5,730	33.64
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-238	1.40
RA Preheat Diff.		-2,368	13.90
Additional Reheat		0	0.00
System Plenum Heat		-3,651	21.43
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-7,324	-17,033	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.5	89.8
Ra Plenum	85.8	51.7
Return	74.2	68.0
Ret/OA	76.5	51.0
Fn MtrTD	0.2	0.0
Fn BldTD	0.5	0.0
Fn Frict	1.5	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	899	305
Terminal	899	305
Main Fan	899	305
Sec Fan	0	0
Nom Vent	122	121
AHU Vent	122	121
Infil	28	28
MinStop/Rh	305	305
Return	926	332
Exhaust	150	149
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	13.6	39.8
cfm/ft²	1.17	0.40
cfm/ton	470.24	
ft²/ton	400.32	
Btu/hr·ft²	29.98	-20.21
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB/WB/HR °F	Enter DB/WB/HR °F	Enter DB/WB/HR gr/lb	Leave DB/WB/HR °F	Leave DB/WB/HR °F	Leave DB/WB/HR gr/lb
Main Clg	1.9	22.9	18.8	899	76.5	63.9	69.5	56.3	55.4	64.9
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	1.9	22.9								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	765		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	462	20	4
Ext Door	33	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-11.3	305	56.3	89.8
Aux Htg	0.0	0	0.0	0.0
Preheat	-4.2	122	25.2	56.3
Reheat	-3.9	305	56.3	68.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-15.5			

Zone Checksums

By HDR

Zone - 002B

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 96 / 77 / 111

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-17.45	-17.45	-0.29
Infiltration	0		0	0
Sub Total ==>	0	-17	-17	0
Internal Loads				
Lights	496	496	991	17
People	865	0	865	14
Misc	1,485	0	1,485	25
Sub Total ==>	2,845	496	3,341	56
Ceiling Load	1,591	-1,591	0	0
Ventilation Load	0	0	2,103	35
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			557	9
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	4,437	-1,113	5,984	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	531	11
People	500	10
Misc	1,596	32
Sub Total ==>	2,627	52
Ceiling Load	1,547	31
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	864	17
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	5,038	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-106.72	2.29
Infiltration	0	0	0.00
Sub Total ==>	0	-107	2.29
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-2,139	0	0.00
Ventilation Load	0	-1,656	35.53
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-74	1.59
RA Preheat Diff.		-684	14.69
Additional Reheat		0	0.00
System Plenum Heat		-2,139	45.90
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-2,139	-4,660	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.5	90.0
Ra Plenum	86.1	51.7
Return	74.0	68.0
Ret/OA	77.5	51.0
Fn MtrTD	0.2	0.0
Fn BldTD	0.5	0.0
Fn Frict	1.5	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	293	88
Terminal	293	88
Main Fan	293	88
Sec Fan	0	0
Nom Vent	37	35
AHU Vent	37	35
Infil	0	0
MinStop/Rh	88	88
Return	293	88
Exhaust	37	35
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	12.7	39.8
cfm/ft²	0.71	0.21
cfm/ton	588.43	
ft²/ton	832.26	
Btu/hr·ft²	14.42	-10.97
No. People	2	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.5	6.0	4.4	235	77.5	64.6	71.5	56.3	56.3	68.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.5	6.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	415		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-3.3	88	56.3	90.0
Aux Htg	0.0	0	0.0	0.0
Preheat	-1.3	37	25.2	56.3
Reheat	-1.1	88	56.3	68.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-4.6			

Zone Checksums

By HDR

Zone - 002C

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 96 / 77 / 111

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-73.39	-73.39	-1.61
Infiltration	0		0	0
Sub Total ==>	0	-73	-73	-2
Internal Loads				
Lights	299	299	597	13
People	756	0	756	17
Misc	1,485	0	1,485	32
Sub Total ==>	2,539	299	2,838	62
Ceiling Load	959	-959	0	0
Ventilation Load	0	0	1,371	30
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			435	10
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	3,498	-733	4,570	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	320	10
People	437	13
Misc	1,596	49
Sub Total ==>	2,353	72
Ceiling Load	932	28
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing		
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	3,284	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-448.81	13.55
Infiltration	0	0	0.00
Sub Total ==>	0	-449	13.55
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,289	0	0.00
Ventilation Load	0	-1,080	32.60
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-48	1.45
RA Preheat Diff.		-446	13.48
Additional Reheat		0	0.00
System Plenum Heat		-1,289	38.91
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,289	-3,311	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.5	88.3
Ra Plenum	86.1	51.7
Return	74.0	68.0
Ret/OA	76.9	51.0
Fn MtrTD	0.2	0.0
Fn BldTD	0.5	0.0
Fn Frict	1.5	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	191	57
Terminal	191	57
Main Fan	191	57
Sec Fan	0	0
Nom Vent	24	23
AHU Vent	24	23
Infil	0	0
MinStop/Rh	57	57
Return	191	57
Exhaust	24	23
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	12.7	39.8
cfm/ft²	0.77	0.23
cfm/ton	502.29	
ft²/ton	656.42	
Btu/hr·ft²	18.28	-11.45
No. People	2	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	0.4	4.6	3.4	183	76.9	64.2	70.3	56.3	56.0	67.2
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.4	4.6								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	250		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.0	57	56.3	88.3
Aux Htg	0.0	0	0.0	0.0
Preheat	-0.8	24	25.2	56.3
Reheat	-0.7	57	56.3	68.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.9			

Zone Checksums

By HDR

Zone - 003A

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 16
Outside Air: OADB/WB/HR: 95 / 76 / 107

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-92.98	-92.98	-0.82
Infiltration	0		0	0
Sub Total ==>	0	-93	-93	-1
Internal Loads				
Lights	430	430	860	8
People	6,300	0	6,300	55
Misc	983	0	983	9
Sub Total ==>	7,713	430	8,143	72
Ceiling Load	1,330	-1,330	0	0
Ventilation Load	0	0	2,471	22
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			862	8
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	9,043	-993	11,383	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	448	7
People	3,500	56
Misc	1,021	16
Sub Total ==>	4,969	79
Ceiling Load	1,305	21
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	6,274	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-628.33	8.41
Infiltration	0	0	0.00
Sub Total ==>	0	-628	8.41
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,804	0	0.00
Ventilation Load	0	-3,566	47.72
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		-1,474	19.73
Additional Reheat		0	0.00
System Plenum Heat		-1,804	24.14
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,804	-7,472	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.5	76.6
Ra Plenum	86.0	51.7
Return	74.0	68.0
Ret/OA	76.7	51.0
Fn MtrTD	0.2	0.0
Fn BldTD	0.5	0.0
Fn Frict	1.5	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	365	190
Terminal	365	190
Main Fan	365	190
Sec Fan	0	0
Nom Vent	46	75
AHU Vent	46	75
Infil	0	0
MinStop/Rh	190	190
Return	365	190
Exhaust	46	75
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	12.7	39.8
cfm/ft²	1.04	0.54
cfm/ton	385.22	
ft²/ton	368.98	
Btu/hr·ft²	32.52	-19.55
No. People	14	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	1.0	11.4	7.2	364	76.7	64.0	69.6	56.3	53.5	57.1
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	1.0	11.4								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	350		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-4.3	190	56.3	76.6
Aux Htg	0.0	0	0.0	0.0
Preheat	-2.6	75	25.2	56.3
Reheat	-2.5	190	56.3	68.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-6.8			

Zone Checksums

By HDR

Zone - 004A

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 17
Outside Air: OADB/WB/HR: 94 / 75 / 105

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	1,773	534	2,307	33
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-46.83	-46.83	-0.66
Infiltration	0		0	0
Sub Total ==>	1,773	487	2,260	32
Internal Loads				
Lights	293	293	586	8
People	900	0	900	13
Misc	952	0	952	13
Sub Total ==>	2,145	293	2,438	35
Ceiling Load	857	-857	0	0
Ventilation Load	0	0	1,761	25
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			604	9
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	4,776	-77	7,064	100.00

CLG SPACE PEAK

Mo/Hr: 9 / 17
OADB: 85

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	2,208	46
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	2,208	46
Internal Loads		
Lights	293	6
People	500	11
Misc	952	20
Sub Total ==>	1,745	37
Ceiling Load	797	17
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	4,751	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-627	-757	16.81
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-412.90	9.17
Infiltration	0	0	0.00
Sub Total ==>	-627	-1,170	25.99
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,185	0	0.00
Ventilation Load	0	-1,561	34.68
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-70	1.55
RA Preheat Diff.		-645	14.33
Additional Reheat		0	0.00
System Plenum Heat		-1,056	23.45
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,813	-4,502	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.5	87.8
Ra Plenum	85.8	51.7
Return	74.0	68.0
Ret/OA	76.7	51.0
Fn MtrTD	0.2	0.0
Fn BldTD	0.5	0.0
Fn Frict	1.5	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	277	83
Terminal	277	83
Main Fan	277	83
Sec Fan	0	0
Nom Vent	35	33
AHU Vent	35	33
Infil	0	0
MinStop/Rh	83	83
Return	277	83
Exhaust	35	33
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	12.7	39.8
cfm/ft²	1.20	0.36
cfm/ton	470.06	
ft²/ton	390.73	
Btu/hr·ft²	30.71	-17.78
No. People	2	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.6	7.1	5.7	255	76.7	64.0	69.8	56.3	54.8	62.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.6	7.1								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	230		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	220	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.9	83	56.3	87.8
Aux Htg	0.0	0	0.0	0.0
Preheat	-1.2	35	25.2	56.3
Reheat	-1.1	83	56.3	68.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-4.1			

Zone Checksums

By HDR

Zone - 004B

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 12
Outside Air: OADB/WB/HR: 91 / 75 / 104

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	1,278	0	1,278	5
Glass/Door Cond	228	0	228	1
Wall Cond	4,131	1,273	5,404	22
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-193.76	-193.76	-0.79
Infiltration	0		0	0
Sub Total ==>	5,638	1,079	6,717	27
Internal Loads				
Lights	1,159	1,159	2,318	9
People	2,678	0	2,678	11
Misc	4,657	0	4,657	19
Sub Total ==>	8,493	1,159	9,652	39
Ceiling Load	3,367	-3,367	0	0
Ventilation Load	0	0	5,997	24
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			2,261	9
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	17,498	-1,129	24,627	100.00

CLG SPACE PEAK

Mo/Hr: 9 / 12
OADB: 82

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	1,897	11
Glass/Door Cond	90	1
Wall Cond	4,588	27
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	6,575	38
Internal Loads		
Lights	1,159	7
People	1,558	9
Misc	4,657	27
Sub Total ==>	7,373	43
Ceiling Load	3,182	19
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	17,130	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-636	-636	3.67
Wall Cond	-2,014	-2,459	14.18
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-1,615.71	9.32
Infiltration	0	0	0.00
Sub Total ==>	-2,650	-4,710	27.17
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-4,639	0	0.00
Ventilation Load	0	-5,783	33.36
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-258	1.49
RA Preheat Diff.		-2,390	13.79
Additional Reheat		0	0.00
System Plenum Heat		-4,194	24.19
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-7,289	-17,336	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.5	89.5
Ra Plenum	85.8	51.7
Return	74.0	68.0
Ret/OA	76.3	51.0
Fn MtrTD	0.2	0.0
Fn BldTD	0.5	0.0
Fn Frict	1.5	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	998	307
Terminal	998	307
Main Fan	998	307
Sec Fan	0	0
Nom Vent	130	122
AHU Vent	130	122
Infil	0	0
MinStop/Rh	307	307
Return	998	307
Exhaust	130	122
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	13.0	39.8
cfm/ft²	1.11	0.34
cfm/ton	486.15	
ft²/ton	438.55	
Btu/hr·ft²	27.36	-17.47
No. People	7	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	2.1	24.6	20.0	954	76.3	63.8	69.5	56.3	55.3	64.2
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	2.1	24.6								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	900		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	753	36	5
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-11.3	307	56.3	89.5
Aux Htg	0.0	0	0.0	0.0
Preheat	-4.5	130	25.2	56.3
Reheat	-4.0	307	56.3	68.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-15.7			

Zone Checksums

By HDR

Zone - 005A

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 12
Outside Air: OADB/WB/HR: 91 / 75 / 104

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	1,088	0	1,088	8
Glass/Door Cond	228	0	228	2
Wall Cond	4,014	1,275	5,289	37
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-98.60	-98.60	-0.68
Infiltration	0		0	0
Sub Total ==>	5,331	1,176	6,507	45
Internal Loads				
Lights	589	589	1,178	8
People	767	0	767	5
Misc	962	0	962	7
Sub Total ==>	2,318	589	2,907	20
Ceiling Load	1,599	-1,599	0	0
Ventilation Load	0	0	3,776	26
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	25		25	0
Exhaust Heat		26	26	0
Sup. Fan Heat			1,208	8
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	9,273	191	14,449	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 11
OADB: 88

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	1,337	15
Glass/Door Cond	174	2
Wall Cond	3,990	44
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	5,502	60
Internal Loads		
Lights	584	6
People	500	5
Misc	952	10
Sub Total ==>	2,036	22
Ceiling Load	1,526	17
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	42	0
Grand Total ==>	9,106	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-636	-636	5.79
Wall Cond	-1,781	-2,177	19.81
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-822.22	7.48
Infiltration	0	0	0.00
Sub Total ==>	-2,417	-3,636	33.08
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-2,361	0	0.00
Ventilation Load	0	-3,698	33.65
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-165	1.50
RA Preheat Diff.		-1,529	13.91
Additional Reheat		0	0.00
System Plenum Heat		-1,964	17.87
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-4,778	-10,992	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.5	90.0
Ra Plenum	85.8	51.7
Return	74.4	68.0
Ret/OA	77.1	51.0
Fn MtrTD	0.2	0.0
Fn BldTD	0.5	0.0
Fn Frict	1.5	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	509	197
Terminal	509	197
Main Fan	509	197
Sec Fan	0	0
Nom Vent	83	78
AHU Vent	83	78
Infil	0	0
MinStop/Rh	197	197
Return	509	197
Exhaust	83	78
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	16.3	39.8
cfm/ft²	1.11	0.43
cfm/ton	423.11	
ft²/ton	380.38	
Btu/hr·ft²	31.55	-22.20
No. People	2	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB/WB/HR °F	Enter DB/WB/HR °F	Enter DB/WB/HR gr/lb	Leave DB/WB/HR °F	Leave DB/WB/HR °F	Leave DB/WB/HR gr/lb
Main Clg	1.2	14.5	11.9	510	77.1	64.3	70.6	56.3	54.9	62.9
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	1.2	14.5								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	458		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	671	36	5
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-7.3	197	56.3	90.0
Aux Htg	0.0	0	0.0	0.0
Preheat	-2.9	83	25.2	56.3
Reheat	-2.5	197	56.3	68.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-10.2			

Zone Checksums

By HDR

Zone - 006A

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 17
Outside Air: OADB/WB/HR: 94 / 75 / 105

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	393	0	393	13
Glass Solar	0	0	0	0
Glass/Door Cond	115	0	115	4
Wall Cond	1,546	0	1,546	50
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	550		550	18
Sub Total ==>	2,603	0	2,603	85
Internal Loads				
Lights	459	0	459	15
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	459	0	459	15
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			9	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	3,062	0	3,071	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	393	14
Glass Solar	0	0
Glass/Door Cond	115	4
Wall Cond	1,546	56
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	244	9
Sub Total ==>	2,298	83
Internal Loads		
Lights	459	17
People	0	0
Misc	0	0
Sub Total ==>	459	17
Ceiling Load	0	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	2,757	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	-145	-145	8.58
Glass Solar	0	0	0.00
Glass/Door Cond	-228	-228	13.51
Wall Cond	-788	-788	46.67
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	0.00	0.00
Infiltration	-527	-527	31.24
Sub Total ==>	-1,688	-1,688	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	0	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,688	-1,688	100.00

TEMPERATURES

	Cooling	Heating
SADB	64.1	64.8
Ra Plenum	80.0	55.0
Return	80.0	55.0
Ret/OA	80.0	55.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	157	157
Terminal	157	157
Main Fan	157	157
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	16	16
MinStop/Rh	0	0
Return	173	173
Exhaust	16	16
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.87	0.87
cfm/ton	611.68	
ft²/ton	703.29	
Btu/hr·ft²	17.06	-9.38
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	0.3	3.1	2.8	157	80.1	66.6	77.5	64.1	60.7	74.8
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.3	3.1								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	180		
Part	0		
Int Door	0		
ExFlr	0		
Roof	180	0	0
Wall	297	0	0
Ext Door	21	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.7	157	55.0	64.8
Aux Htg	0.0	0	0.0	0.0
Preheat	-1.6	157	55.0	64.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-1.7			

Zone Checksums

By HDR

Zone - 007A

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 6 / 11
Outside Air: OADB/WB/HR: 86 / 69 / 83

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	892	265	1,157	16
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-10.56	-10.56	-0.14
Infiltration	0		0	0
Sub Total ==>	892	255	1,147	15
Internal Loads				
Lights	140	140	280	4
People	0	0	0	0
Misc	6,000	0	6,000	81
Sub Total ==>	6,140	140	6,280	84
Ceiling Load	396	-396	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			21	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	7,428	-1	7,448	100.00

CLG SPACE PEAK

Mo/Hr: 6 / 11
OADB: 86

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	892	12
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	892	12
Internal Loads		
Lights	140	2
People	0	0
Misc	6,000	81
Sub Total ==>	6,140	83
Ceiling Load	396	5
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	7,428	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-360	-448	33.45
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-581.06	43.39
Infiltration	0	0	0.00
Sub Total ==>	-360	-1,029	76.84
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-398	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-310	23.16
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-758	-1,339	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	69.9
Ra Plenum	85.4	56.6
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	354	354
Terminal	354	354
Main Fan	354	354
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	0	0
Return	354	354
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	3.22	3.22
cfm/ton	570.28	
ft²/ton	177.23	
Btu/hr·ft²	67.71	-6.89
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.6	7.5	7.5	354	74.1	56.6	41.4	55.0	48.6	41.1
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.6	7.5								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	110		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	126	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.8	354	68.0	69.9
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-0.8			

Zone Checksums

By HDR

100 VESTIBULE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 0 / 0
Outside Air: OADB/WB/HR: 0 / 0 / 0

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	0		0	0
Sub Total ==>	0	0	0	0
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	0	0	0	100.00

CLG SPACE PEAK

Mo/Hr: 0 / 0
OADB: 0

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load	0	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	0	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-80	3.93
Glass Solar	0	0	0.00
Glass/Door Cond	-751	-751	37.06
Wall Cond	-766	-1,000	49.36
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	0.00	0.00
Infiltration	-196	-196	9.66
Sub Total ==>	-1,713	-2,027	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-314	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-2,027	-2,027	100.00

TEMPERATURES

	Cooling	Heating
SADB	0.0	125.0
Ra Plenum	0.0	57.2
Return	0.0	68.0
Ret/OA	0.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	32
Terminal	0	32
Main Fan	0	32
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	4
MinStop/Rh	0	0
Return	0	36
Exhaust	0	4
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.00	0.35
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	-22.03
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	92		
Part	0		
Int Door	0		
ExFlr	0		
Roof	92	0	0
Wall	303	20	7
Ext Door	26	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.0	32	68.0	125.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.0			

Zone Checksums

By HDR

101 LOBBY

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 16
Outside Air: OADB/WB/HR: 95 / 76 / 107

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	1,377	0	1,377	5
Glass/Door Cond	331	0	331	1
Wall Cond	2,737	932	3,669	12
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	602.44	602.44	1.97
Infiltration	2,084		2,084	7
Sub Total ==>	6,528	1,534	8,063	26
Internal Loads				
Lights	1,057	1,057	2,113	7
People	5,400	0	5,400	18
Misc	1,536	0	1,536	5
Sub Total ==>	7,993	1,057	9,049	30
Ceiling Load	2,281	-2,281	0	0
Ventilation Load	0	0	6,940	23
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			6,141	20
Ov/Undr Sizing	140		140	0
Exhaust Heat		0	0	0
Sup. Fan Heat			197	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	16,942	310	30,531	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	1,493	11
Glass/Door Cond	312	2
Wall Cond	3,204	23
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	846	6
Sub Total ==>	5,856	42
Internal Loads		
Lights	1,101	8
People	3,000	21
Misc	1,596	11
Sub Total ==>	5,696	41
Ceiling Load	2,362	17
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	140	1
Grand Total ==>	14,054	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-636	-636	2.41
Wall Cond	-1,183	-1,509	5.72
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-4,916.62	18.64
Infiltration	-1,829	-1,829	6.94
Sub Total ==>	-3,648	-8,891	33.71
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-3,014	0	0.00
Ventilation Load	0	-6,094	23.10
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-1,829	-1,829	6.94
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-6,874	26.06
System Plenum Heat		-2,688	10.19
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-8,492	-26,376	100.00

TEMPERATURES

	Cooling	Heating
SADB	54.9	79.5
Ra Plenum	82.4	56.9
Return	74.0	68.0
Ret/OA	78.1	59.7
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	666	666
Terminal	666	666
Main Fan	666	666
Sec Fan	0	0
Nom Vent	129	129
AHU Vent	129	129
Infil	39	39
MinStop/Rh	666	666
Return	705	705
Exhaust	168	168
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	19.3	19.3
cfm/ft²	0.77	0.77
cfm/ton	234.00	
ft²/ton	302.04	
Btu/hr·ft²	39.73	-30.97
No. People	12	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	2.9	34.2	20.1	666	78.1	64.9	71.9	50.6	46.9	42.1
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	2.9	34.2								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	860		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	462	36	8
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-26.6	666	50.6	79.5
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-17.4	666	50.4	74.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-26.6			

Zone Checksums

By HDR

102 WOMENS RR

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 17
Outside Air: OADB/WB/HR: 94 / 75 / 105

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	631	191	822	40
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	43.49	43.49	2.10
Infiltration	0		0	0
Sub Total ==>	631	234	866	42
Internal Loads				
Lights	89	89	178	9
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	89	89	178	9
Ceiling Load	192	-192	0	0
Ventilation Load	0	0	518	25
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			483	23
Ov/Undr Sizing	11		11	1
Exhaust Heat		0	0	0
Sup. Fan Heat			16	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	924	131	2,072	100.00

CLG SPACE PEAK

Mo/Hr: 6 / 19
OADB: 87

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	848	76
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	848	76
Internal Loads		
Lights	72	7
People	0	0
Misc	0	0
Sub Total ==>	72	7
Ceiling Load	183	16
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	11	1
Grand Total ==>	1,114	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-291	-363	17.68
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-355.08	17.27
Infiltration	0	0	0.00
Sub Total ==>	-291	-719	34.95
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-245	0	0.00
Ventilation Load	0	-483	23.49
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-136	-136	6.63
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-545	26.50
System Plenum Heat		-173	8.43
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-673	-2,056	100.00

TEMPERATURES

	Cooling	Heating
SADB	54.9	79.5
Ra Plenum	82.7	56.9
Return	74.0	68.0
Ret/OA	77.8	59.7
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	53	53
Terminal	53	53
Main Fan	53	53
Sec Fan	0	0
Nom Vent	10	10
AHU Vent	10	10
Infil	0	0
MinStop/Rh	53	53
Return	53	53
Exhaust	10	10
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	19.3	19.3
cfm/ft²	0.75	0.75
cfm/ton	274.54	
ft²/ton	363.87	
Btu/hr·ft²	32.98	-30.13
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	0.2	2.3	1.5	53	77.8	64.7	71.5	50.6	49.7	52.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.2	2.3								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	70		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	102	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.1	53	50.6	79.5
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-1.4	53	50.4	74.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.1			

Zone Checksums

By HDR

103 MENS RR

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 96 / 77 / 111

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	50.17	50.17	8.14
Infiltration	0		0	0
Sub Total ==>	0	50	50	8
Internal Loads				
Lights	78	78	155	25
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	78	78	155	25
Ceiling Load	167	-167	0	0
Ventilation Load	0	0	197	32
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			93	15
Ov/Undr Sizing	115		115	19
Exhaust Heat		0	0	0
Sup. Fan Heat			5	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	360	-39	616	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	83	22
People	0	0
Misc	0	0
Sub Total ==>	83	22
Ceiling Load	179	47
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Dehumid. Ov Sizing		
Ov/Undr Sizing	115	31
Exhaust Heat		
Sup. Fan Heat		
Ret. Fan Heat		
Duct Heat Pkup		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	377	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-398.57	40.91
Infiltration	0	0	0.00
Sub Total ==>	0	-399	40.91
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-228	0	0.00
Ventilation Load	0	-164	16.78
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-184	18.93
System Plenum Heat		-228	23.38
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-228	-974	100.00

TEMPERATURES

	Cooling	Heating
SADB	54.9	79.5
Ra Plenum	82.1	56.9
Return	74.0	68.0
Ret/OA	78.3	59.7
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	18	18
Terminal	18	18
Main Fan	18	18
Sec Fan	0	0
Nom Vent	3	3
AHU Vent	3	3
Infil	0	0
MinStop/Rh	18	18
Return	18	18
Exhaust	3	3
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	19.3	19.3
cfm/ft²	0.28	0.28
cfm/ton	316.69	
ft²/ton	1,151.50	
Btu/hr·ft²	10.42	-10.32
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.1	0.7	0.5	18	78.3	65.1	72.6	52.4	52.3	58.9
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.1	0.7								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	65		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.7	18	52.4	79.5
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-0.5	18	50.4	74.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-0.7			

Zone Checksums

By HDR

104 WOMENS RR

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 17
Outside Air: OADB/WB/HR: 94 / 75 / 105

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	646	195	842	40
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	42.25	42.25	2.01
Infiltration	0		0	0
Sub Total ==>	646	238	884	42
Internal Loads				
Lights	87	87	173	8
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	87	87	173	8
Ceiling Load	187	-187	0	0
Ventilation Load	0	0	524	25
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			489	23
Ov/Undr Sizing	11		11	1
Exhaust Heat		0	0	0
Sup. Fan Heat			16	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	931	137	2,098	100.00

CLG SPACE PEAK

Mo/Hr: 6 / 19
OADB: 87

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	868	77
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	868	77
Internal Loads		
Lights	70	6
People	0	0
Misc	0	0
Sub Total ==>	70	6
Ceiling Load	177	16
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	11	1
Grand Total ==>	1,127	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-298	-372	18.04
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-341.45	16.56
Infiltration	0	0	0.00
Sub Total ==>	-298	-713	34.60
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-238	0	0.00
Ventilation Load	0	-489	23.70
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-144	-144	7.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-551	26.73
System Plenum Heat		-165	7.98
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-681	-2,062	100.00

TEMPERATURES

	Cooling	Heating
SADB	54.9	79.5
Ra Plenum	82.7	56.9
Return	74.0	68.0
Ret/OA	77.8	59.7
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	53	53
Terminal	53	53
Main Fan	53	53
Sec Fan	0	0
Nom Vent	10	10
AHU Vent	10	10
Infil	0	0
MinStop/Rh	53	53
Return	53	53
Exhaust	10	10
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	19.3	19.3
cfm/ft²	0.79	0.79
cfm/ton	274.29	
ft²/ton	349.15	
Btu/hr·ft²	34.37	-31.38
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.2	2.3	1.6	53	77.8	64.7	71.5	50.6	49.7	52.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.2	2.3								

AREAS

	Gross Total ft²	Glass ft²	Glass (%)
Floor	68		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	104	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.1	53	50.6	79.5
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-1.4	53	50.4	74.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.1			

Zone Checksums

By HDR

105 MENS RR

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 96 / 77 / 111

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	47.85	47.85	8.14
Infiltration	0		0	0
Sub Total ==>	0	48	48	8
Internal Loads				
Lights	74	74	148	25
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	74	74	148	25
Ceiling Load	159	-159	0	0
Ventilation Load	0	0	188	32
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			89	15
Ov/Undr Sizing	110		110	19
Exhaust Heat		0	0	0
Sup. Fan Heat			5	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
***Grand Total* ==>**	343	-37	588	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	79	22
People	0	0
Misc	0	0
Sub Total ==>	79	22
Ceiling Load	170	47
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	110	31
***Grand Total* ==>**	360	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-380.17	40.91
Infiltration	0	0	0.00
Sub Total ==>	0	-380	40.91
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-217	0	0.00
Ventilation Load	0	-156	16.78
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-176	18.93
System Plenum Heat		-217	23.38
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
***Grand Total* ==>**	-217	-929	100.00

TEMPERATURES

	Cooling	Heating
SADB	54.9	79.5
Ra Plenum	82.1	56.9
Return	74.0	68.0
Ret/OA	78.3	59.7
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	17	17
Terminal	17	17
Main Fan	17	17
Sec Fan	0	0
Nom Vent	3	3
AHU Vent	3	3
Infil	0	0
MinStop/Rh	17	17
Return	17	17
Exhaust	3	3
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	19.3	19.3
cfm/ft²	0.28	0.28
cfm/ton	316.69	
ft²/ton	1,151.49	
Btu/hr·ft²	10.42	-10.32
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.1	0.7	0.4	17	78.3	65.1	72.6	52.4	52.3	58.9
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.1	0.7								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	62		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.6	17	52.4	79.5
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-0.4	17	50.4	74.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-0.6			

Zone Checksums

By HDR

106 VCC OFFICE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 96 / 77 / 111

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	320.29	320.29	4.35
Infiltration	0		0	0
Sub Total ==>	0	320	320	4
Internal Loads				
Lights	496	496	991	13
People	865	0	865	12
Misc	1,485	0	1,485	20
Sub Total ==>	2,845	496	3,341	45
Ceiling Load	1,066	-1,066	0	0
Ventilation Load	0	0	1,990	27
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			1,612	22
Ov/Undr Sizing	38		38	1
Exhaust Heat		0	0	0
Sup. Fan Heat			53	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	3,949	-250	7,355	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	531	14
People	500	13
Misc	1,596	42
Sub Total ==>	2,627	69
Ceiling Load	1,140	30
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	38	1
Grand Total ==>	3,805	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-2,544.70	30.46
Infiltration	0	0	0.00
Sub Total ==>	0	-2,545	30.46
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,454	0	0.00
Ventilation Load	0	-1,650	19.75
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-844	-844	10.11
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-1,861	22.27
System Plenum Heat		-1,454	17.41
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-2,299	-8,354	100.00

TEMPERATURES

	Cooling	Heating
SADB	54.9	79.5
Ra Plenum	82.1	56.9
Return	74.0	68.0
Ret/OA	78.3	59.7
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	180	180
Terminal	180	180
Main Fan	180	180
Sec Fan	0	0
Nom Vent	35	35
AHU Vent	35	35
Infil	0	0
MinStop/Rh	180	180
Return	180	180
Exhaust	35	35
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	19.3	19.3
cfm/ft²	0.43	0.43
cfm/ton	263.59	
ft²/ton	606.49	
Btu/hr·ft²	19.79	-17.30
No. People	2	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB/WB/HR °F	Enter DB/WB/HR °F	Enter DB/WB/HR gr/lb	Leave DB/WB/HR °F	Leave DB/WB/HR °F	Leave DB/WB/HR gr/lb
Main Clg	0.7	8.2	5.0	180	78.3	65.1	72.6	50.7	49.5	51.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.7	8.2								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	415		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-7.2	180	50.7	79.5
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-4.7	180	50.4	74.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-7.2			

Zone Checksums

By HDR

107 JANITORS

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 96 / 77 / 111

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	50.17	50.17	8.14
Infiltration	0		0	0
Sub Total ==>	0	50	50	8
Internal Loads				
Lights	78	78	155	25
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	78	78	155	25
Ceiling Load	167	-167	0	0
Ventilation Load	0	0	197	32
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			93	15
Ov/Undr Sizing	115		115	19
Exhaust Heat		0	0	0
Sup. Fan Heat			5	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	360	-39	616	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	83	22
People	0	0
Misc	0	0
Sub Total ==>	83	22
Ceiling Load	179	47
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Dehumid. Ov Sizing		
Ov/Undr Sizing	115	31
Exhaust Heat		
Sup. Fan Heat		
Ret. Fan Heat		
Duct Heat Pkup		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	377	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-398.57	40.91
Infiltration	0	0	0.00
Sub Total ==>	0	-399	40.91
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-228	0	0.00
Ventilation Load	0	-164	16.78
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-184	18.93
System Plenum Heat		-228	23.38
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-228	-974	100.00

TEMPERATURES

	Cooling	Heating
SADB	54.9	79.5
Ra Plenum	82.1	56.9
Return	74.0	68.0
Ret/OA	78.3	59.7
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	18	18
Terminal	18	18
Main Fan	18	18
Sec Fan	0	0
Nom Vent	3	3
AHU Vent	3	3
Infil	0	0
MinStop/Rh	18	18
Return	18	18
Exhaust	3	3
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	19.3	19.3
cfm/ft²	0.28	0.28
cfm/ton	316.69	
ft²/ton	1,151.50	
Btu/hr·ft²	10.42	-10.32
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.1	0.7	0.5	18	78.3	65.1	72.6	52.4	52.3	58.9
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.1	0.7								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	65		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.7	18	52.4	79.5
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-0.5	18	50.4	74.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-0.7			

Zone Checksums

By HDR

108 STORAGE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 96 / 77 / 111

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	65.60	65.60	6.22
Infiltration	0		0	0
Sub Total ==>	0	66	66	6
Internal Loads				
Lights	102	102	203	19
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	102	102	203	19
Ceiling Load	111	-111	0	0
Ventilation Load	0	0	238	23
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			179	17
Ov/Undr Sizing	362		362	34
Exhaust Heat		0	0	0
Sup. Fan Heat			7	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	574	57	1,055	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	109	18
People	0	0
Misc	0	0
Sub Total ==>	109	18
Ceiling Load	126	21
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	362	61
Grand Total ==>	596	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-521.20	40.91
Infiltration	0	0	0.00
Sub Total ==>	0	-521	40.91
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-298	0	0.00
Ventilation Load	0	-214	16.78
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-241	18.93
System Plenum Heat		-298	23.38
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-298	-1,274	100.00

TEMPERATURES

	Cooling	Heating
SADB	54.9	79.5
Ra Plenum	82.1	56.9
Return	78.0	68.0
Ret/OA	81.5	59.7
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	23	23
Terminal	23	23
Main Fan	23	23
Sec Fan	0	0
Nom Vent	5	5
AHU Vent	5	5
Infil	0	0
MinStop/Rh	23	23
Return	23	23
Exhaust	5	5
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	19.3	19.3
cfm/ft²	0.28	0.28
cfm/ton	247.85	
ft²/ton	901.22	
Btu/hr·ft²	13.32	-10.74
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.1	1.1	0.8	23	81.5	66.1	72.6	51.3	49.7	51.1
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.1	1.1								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	85		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.9	23	51.3	79.5
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-0.7	23	50.4	78.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-0.9			

Zone Checksums

By HDR

109 VESTIBULE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 0 / 0
Outside Air: OADB/WB/HR: 0 / 0 / 0

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	0		0	0
Sub Total ==>	0	0	0	0
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	0	0	0	100.00

CLG SPACE PEAK

Mo/Hr: 0 / 0
OADB: 0

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load	0	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	0	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-751	-751	28.34
Wall Cond	-598	-777	29.31
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-548.99	20.72
Infiltration	-255	-255	9.63
Sub Total ==>	-1,604	-2,332	88.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-497	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-318	12.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-2,101	-2,650	100.00

TEMPERATURES

	Cooling	Heating
SADB	0.0	125.0
Ra Plenum	0.0	54.9
Return	0.0	68.0
Ret/OA	0.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	33
Terminal	0	33
Main Fan	0	33
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	5
MinStop/Rh	0	0
Return	0	39
Exhaust	0	5
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.00	0.28
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	-17.51
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	120		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	245	20	8
Ext Door	26	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.1	33	68.0	125.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.1			

Zone Checksums

By HDR

110 MMT CARRIER

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 17
Outside Air: OADB/WB/HR: 94 / 75 / 105

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	1,773	525	2,299	23
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-148.25	-148.25	-1.46
Infiltration	0		0	0
Sub Total ==>	1,773	377	2,150	21
Internal Loads				
Lights	293	293	586	6
People	900	0	900	9
Misc	952	0	952	9
Sub Total ==>	2,145	293	2,438	24
Ceiling Load	978	-978	0	0
Ventilation Load	0	0	1,950	19
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			3,162	31
Ov/Undr Sizing	346		346	3
Exhaust Heat		0	0	0
Sup. Fan Heat			77	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	5,242	-308	10,124	100.00

CLG SPACE PEAK

Mo/Hr: 9 / 17
OADB: 85

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	2,208	43
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	2,208	43
Internal Loads		
Lights	293	6
People	500	10
Misc	952	18
Sub Total ==>	1,745	34
Ceiling Load	897	17
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	346	7
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	5,196	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-627	-742	7.76
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-223.99	2.34
Infiltration	0	0	0.00
Sub Total ==>	-627	-966	10.10
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,410	0	0.00
Ventilation Load	0	-1,782	18.63
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-2,539	-2,539	26.55
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-2,982	31.18
System Plenum Heat		-1,295	13.55
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-4,576	-9,563	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.0	83.9
Ra Plenum	87.4	48.7
Return	74.0	68.0
Ret/OA	76.9	61.8
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	261	261
Terminal	261	261
Main Fan	261	261
Sec Fan	0	0
Nom Vent	38	38
AHU Vent	38	38
Infil	0	0
MinStop/Rh	261	261
Return	261	261
Exhaust	38	38
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	14.5	14.5
cfm/ft²	1.13	1.13
cfm/ton	281.46	
ft²/ton	248.29	
Btu/hr·ft²	48.33	-52.85
No. People	2	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	0.9	11.1	7.0	261	76.9	63.7	68.2	50.1	48.8	49.5
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.9	11.1								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	230		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	220	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-12.2	261	50.1	83.9
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-6.5	261	51.5	74.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-12.2			

Zone Checksums

By HDR

111 TRAF CHECK IN

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 17
Outside Air: OADB/WB/HR: 94 / 75 / 105

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-103.13	-103.13	-3.34
Infiltration	0		0	0
Sub Total ==>	0	-103	-103	-3
Internal Loads				
Lights	205	205	410	13
People	450	0	450	15
Misc	479	0	479	15
Sub Total ==>	1,133	205	1,338	43
Ceiling Load	680	-680	0	0
Ventilation Load	0	0	649	21
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			1,065	34
Ov/Undr Sizing	115		115	4
Exhaust Heat		0	0	0
Sup. Fan Heat			26	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	1,929	-579	3,090	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	205	12
People	250	14
Misc	479	28
Sub Total ==>	933	54
Ceiling Load	680	39
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	115	7
Grand Total ==>	1,729	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-155.82	4.78
Infiltration	0	0	0.00
Sub Total ==>	0	-156	4.78
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-981	0	0.00
Ventilation Load	0	-593	18.17
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-542	-542	16.60
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-992	30.40
System Plenum Heat		-981	30.06
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,522	-3,263	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.0	83.9
Ra Plenum	87.4	48.7
Return	74.0	68.0
Ret/OA	76.9	61.8
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	87	87
Terminal	87	87
Main Fan	87	87
Sec Fan	0	0
Nom Vent	13	13
AHU Vent	13	13
Infil	0	0
MinStop/Rh	87	87
Return	87	87
Exhaust	13	13
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	14.5	14.5
cfm/ft²	0.54	0.54
cfm/ton	308.30	
ft²/ton	568.64	
Btu/hr·ft²	21.10	-25.33
No. People	1	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	0.3	3.4	2.0	87	76.9	63.7	68.2	50.1	50.0	54.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.3	3.4								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	160		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-4.1	87	50.1	83.9
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-2.2	87	51.5	74.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-4.1			

Zone Checksums

By HDR

112 OPEN OFFICE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 96 / 77 / 111

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	439	0	439	1
Glass/Door Cond	329	0	329	1
Wall Cond	3,573	1,034	4,607	14
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-637.81	-637.81	-2.00
Infiltration	0		0	0
Sub Total ==>	4,341	396	4,737	15
Internal Loads				
Lights	876	876	1,751	5
People	2,420	0	2,420	8
Misc	3,816	0	3,816	12
Sub Total ==>	7,111	876	7,987	25
Ceiling Load	3,337	-3,337	0	0
Ventilation Load	0	0	7,256	23
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			10,506	33
Ov/Undr Sizing	1,146		1,146	4
Exhaust Heat		0	0	0
Sup. Fan Heat			256	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	15,935	-2,066	31,888	100.00

CLG SPACE PEAK

Mo/Hr: 9 / 12
OADB: 82

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	1,897	11
Glass/Door Cond	90	1
Wall Cond	4,588	27
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	6,575	38
Internal Loads		
Lights	951	6
People	1,340	8
Misc	4,171	24
Sub Total ==>	6,462	38
Ceiling Load	3,046	18
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	1,146	7
Grand Total ==>	17,229	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-636	-636	2.01
Wall Cond	-2,014	-2,407	7.60
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-720.66	2.27
Infiltration	0	0	0.00
Sub Total ==>	-2,650	-3,764	11.88
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-4,536	0	0.00
Ventilation Load	0	-5,908	18.65
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-7,987	-7,987	25.20
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-9,886	31.20
System Plenum Heat		-4,143	13.08
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-15,173	-31,688	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.0	83.9
Ra Plenum	88.2	48.7
Return	74.0	68.0
Ret/OA	77.2	61.8
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	865	865
Terminal	865	865
Main Fan	865	865
Sec Fan	0	0
Nom Vent	125	125
AHU Vent	125	125
Infil	0	0
MinStop/Rh	865	865
Return	865	865
Exhaust	125	125
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	14.5	14.5
cfm/ft²	1.17	1.17
cfm/ton	297.06	
ft²/ton	254.27	
Btu/hr·ft²	47.19	-54.49
No. People	6	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	2.9	34.9	21.1	865	77.2	64.0	69.0	50.1	50.0	54.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	2.9	34.9								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	740		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	753	36	5
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-40.3	865	50.1	83.9
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-21.5	865	51.5	74.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-40.3			

Zone Checksums

By HDR

113 CONFERENCE/TRAINING

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 16
Outside Air: OADB/WB/HR: 95 / 76 / 107

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-273.40	-273.40	-1.77
Infiltration	0		0	0
Sub Total ==>	0	-273	-273	-2
Internal Loads				
Lights	430	430	860	6
People	6,300	0	6,300	41
Misc	983	0	983	6
Sub Total ==>	7,713	430	8,143	53
Ceiling Load	1,545	-1,545	0	0
Ventilation Load	0	0	2,753	18
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			4,230	27
Ov/Undr Sizing	460		460	3
Exhaust Heat		0	0	0
Sup. Fan Heat			103	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	9,718	-1,388	15,416	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 16
OADB: 95

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	430	6
People	3,500	51
Misc	983	14
Sub Total ==>	4,913	71
Ceiling Load	1,545	22
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	460	7
Grand Total ==>	6,918	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-340.85	2.67
Infiltration	0	0	0.00
Sub Total ==>	0	-341	2.67
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-2,146	0	0.00
Ventilation Load	0	-2,372	18.57
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-3,947	-3,947	30.89
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-3,970	31.07
System Plenum Heat		-2,146	16.79
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-6,093	-12,776	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.0	83.9
Ra Plenum	87.9	48.7
Return	74.0	68.0
Ret/OA	77.1	61.8
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	347	347
Terminal	347	347
Main Fan	347	347
Sec Fan	0	0
Nom Vent	50	50
AHU Vent	50	50
Infil	0	0
MinStop/Rh	347	347
Return	347	347
Exhaust	50	50
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	14.5	14.5
cfm/ft²	0.99	0.99
cfm/ton	244.68	
ft²/ton	246.70	
Btu/hr·ft²	48.64	-46.28
No. People	14	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	1.4	17.0	8.9	347	77.1	63.9	68.5	50.1	46.3	41.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	1.4	17.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	350		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-16.2	347	50.1	83.9
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-8.6	347	51.5	74.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-16.2			

Zone Checksums

By HDR

114 BREAKROOM

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 96 / 77 / 111

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	192.94	192.94	3.20
Infiltration	0		0	0
Sub Total ==>	0	193	193	3
Internal Loads				
Lights	299	299	597	10
People	756	0	756	13
Misc	1,485	0	1,485	25
Sub Total ==>	2,539	299	2,838	47
Ceiling Load	642	-642	0	0
Ventilation Load	0	0	1,606	27
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			1,324	22
Ov/Undr Sizing	31		31	1
Exhaust Heat		0	0	0
Sup. Fan Heat			43	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	3,212	-150	6,035	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	320	10
People	437	14
Misc	1,596	52
Sub Total ==>	2,353	77
Ceiling Load	687	22
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	31	1
Grand Total ==>	3,070	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-1,532.95	24.64
Infiltration	0	0	0.00
Sub Total ==>	0	-1,533	24.64
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-876	0	0.00
Ventilation Load	0	-1,331	21.40
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-979	-979	15.73
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-1,501	24.14
System Plenum Heat		-876	14.08
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,855	-6,220	100.00

TEMPERATURES

	Cooling	Heating
SADB	54.9	79.5
Ra Plenum	82.1	56.9
Return	74.0	68.0
Ret/OA	78.3	59.7
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	146	146
Terminal	146	146
Main Fan	146	146
Sec Fan	0	0
Nom Vent	28	28
AHU Vent	28	28
Infil	0	0
MinStop/Rh	146	146
Return	146	146
Exhaust	28	28
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	19.3	19.3
cfm/ft²	0.58	0.58
cfm/ton	259.23	
ft²/ton	445.29	
Btu/hr·ft²	26.95	-23.23
No. People	2	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	0.6	6.7	4.1	146	78.3	65.1	72.6	50.6	49.1	50.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.6	6.7								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	250		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-5.8	146	50.6	79.5
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-3.8	146	50.4	74.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-5.8			

Zone Checksums

By HDR

116 SR TRAFFIC OFFICE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 96 / 77 / 111

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	146	0	146	2
Glass/Door Cond	110	0	110	1
Wall Cond	1,115	326	1,441	20
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-149.11	-149.11	-2.02
Infiltration	0		0	0
Sub Total ==>	1,371	177	1,548	21
Internal Loads				
Lights	205	205	409	6
People	403	0	403	5
Misc	440	0	440	6
Sub Total ==>	1,048	205	1,253	17
Ceiling Load	780	-780	0	0
Ventilation Load	0	0	1,734	23
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			2,510	34
Ov/Undr Sizing	274		274	4
Exhaust Heat		0	0	0
Sup. Fan Heat			61	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	3,473	-399	7,379	100.00

CLG SPACE PEAK

Mo/Hr: 9 / 12
OADB: 82

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	632	15
Glass/Door Cond	30	1
Wall Cond	1,541	37
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	2,203	54
Internal Loads		
Lights	222	5
People	223	5
Misc	481	12
Sub Total ==>	927	23
Ceiling Load	712	17
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	274	7
Grand Total ==>	4,116	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-212	-212	2.80
Wall Cond	-614	-735	9.71
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-168.48	2.23
Infiltration	0	0	0.00
Sub Total ==>	-826	-1,115	14.74
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,061	0	0.00
Ventilation Load	0	-1,412	18.65
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-1,738	-1,738	22.97
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-2,362	31.21
System Plenum Heat		-940	12.42
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-3,625	-7,567	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.0	83.9
Ra Plenum	88.2	48.7
Return	74.0	68.0
Ret/OA	77.2	61.8
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	207	207
Terminal	207	207
Main Fan	207	207
Sec Fan	0	0
Nom Vent	30	30
AHU Vent	30	30
Infil	0	0
MinStop/Rh	207	207
Return	207	207
Exhaust	30	30
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	14.5	14.5
cfm/ft²	1.19	1.19
cfm/ton	307.21	
ft²/ton	257.30	
Btu/hr·ft²	46.64	-55.69
No. People	1	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	0.7	8.1	4.9	207	77.2	64.0	69.0	50.1	50.0	54.1
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.7	8.1								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	173		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	231	12	5
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-9.6	207	50.1	83.9
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-5.1	207	51.5	74.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-9.6			

Zone Checksums

By HDR

117 SR TRAFFIC OFFICE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 11
Outside Air: OADB/WB/HR: 88 / 72 / 97

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	847	0	847	8
Glass/Door Cond	116	0	116	1
Wall Cond	2,108	679	2,787	27
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-106.79	-106.79	-1.05
Infiltration	0		0	0
Sub Total ==>	3,071	572	3,643	36
Internal Loads				
Lights	248	248	497	5
People	450	0	450	4
Misc	476	0	476	5
Sub Total ==>	1,175	248	1,423	14
Ceiling Load	807	-807	0	0
Ventilation Load	0	0	1,487	15
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			3,168	31
Ov/Undr Sizing	346		346	3
Exhaust Heat		0	0	0
Sup. Fan Heat			77	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	5,398	14	10,144	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 11
OADB: 88

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	847	16
Glass/Door Cond	116	2
Wall Cond	2,108	41
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	3,071	59
Internal Loads		
Lights	248	5
People	250	5
Misc	476	9
Sub Total ==>	975	19
Ceiling Load	807	16
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	346	7
Grand Total ==>	5,198	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-424	-424	4.45
Wall Cond	-869	-1,044	10.95
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-189.90	1.99
Infiltration	0	0	0.00
Sub Total ==>	-1,293	-1,658	17.39
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,195	0	0.00
Ventilation Load	0	-1,783	18.70
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-2,090	-2,090	21.92
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-2,983	31.29
System Plenum Heat		-1,020	10.70
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-4,578	-9,533	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.0	83.9
Ra Plenum	87.1	48.7
Return	74.0	68.0
Ret/OA	76.0	61.8
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	261	261
Terminal	261	261
Main Fan	261	261
Sec Fan	0	0
Nom Vent	38	38
AHU Vent	38	38
Infil	0	0
MinStop/Rh	261	261
Return	261	261
Exhaust	38	38
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	14.5	14.5
cfm/ft²	1.34	1.34
cfm/ton	281.01	
ft²/ton	210.07	
Btu/hr·ft²	57.12	-62.38
No. People	1	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	0.9	11.1	7.4	261	76.0	63.2	67.1	50.1	48.0	46.8
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.9	11.1								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	195		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	336	24	7
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-12.2	261	50.1	83.9
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-6.5	261	51.5	74.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-12.2			

Zone Checksums

By HDR

118 FILE ROOM

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 11
Outside Air: OADB/WB/HR: 88 / 72 / 97

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	689	209	898	45
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-49.29	-49.29	-2.46
Infiltration	0		0	0
Sub Total ==>	689	159	849	42
Internal Loads				
Lights	115	115	229	11
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	115	115	229	11
Ceiling Load	258	-258	0	0
Ventilation Load	0	0	245	12
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			575	29
Ov/Undr Sizing	95		95	5
Exhaust Heat		0	0	0
Sup. Fan Heat			14	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	1,157	16	2,007	100.00

CLG SPACE PEAK

Mo/Hr: 6 / 11
OADB: 86

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	711	60
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	711	60
Internal Loads		
Lights	115	10
People	0	0
Misc	0	0
Sub Total ==>	115	10
Ceiling Load	258	22
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	95	8
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	1,179	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-298	-353	19.36
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-87.65	4.81
Infiltration	0	0	0.00
Sub Total ==>	-298	-440	24.16
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-552	0	0.00
Ventilation Load	0	-331	18.16
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-554	30.39
System Plenum Heat		-497	27.28
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-850	-1,822	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.0	83.9
Ra Plenum	87.1	48.7
Return	78.0	68.0
Ret/OA	79.4	61.8
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	48	48
Terminal	48	48
Main Fan	48	48
Sec Fan	0	0
Nom Vent	7	7
AHU Vent	7	7
Infil	0	0
MinStop/Rh	48	48
Return	48	48
Exhaust	7	7
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	14.5	14.5
cfm/ft²	0.54	0.54
cfm/ton	263.20	
ft²/ton	489.11	
Btu/hr·ft²	24.53	-25.00
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	0.2	2.2	1.5	48	79.4	64.3	67.1	50.2	48.4	47.9
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.2	2.2								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	90		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	104	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.3	48	50.2	83.9
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-1.4	48	51.5	78.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.3			

Zone Checksums

By HDR

119 COMM

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 6 / 11
Outside Air: OADB/WB/HR: 86 / 69 / 83

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	892	265	1,157	16
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-10.16	-10.16	-0.14
Infiltration	0		0	0
Sub Total ==>	892	255	1,147	15
Internal Loads				
Lights	140	140	280	4
People	0	0	0	0
Misc	6,000	0	6,000	81
Sub Total ==>	6,140	140	6,280	84
Ceiling Load	395	-395	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			21	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	7,428	0	7,448	100.00

CLG SPACE PEAK

Mo/Hr: 6 / 11
OADB: 86

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	892	12
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	892	12
Internal Loads		
Lights	140	2
People	0	0
Misc	6,000	81
Sub Total ==>	6,140	83
Ceiling Load	395	5
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	7,428	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-360	-447	32.98
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-581.06	42.90
Infiltration	0	0	0.00
Sub Total ==>	-360	-1,028	75.88
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-413	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-327	24.12
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-773	-1,354	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	70.0
Ra Plenum	85.4	56.1
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	354	354
Terminal	354	354
Main Fan	354	354
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	0	0
Return	354	354
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	3.22	3.22
cfm/ton	570.21	
ft²/ton	177.22	
Btu/hr·ft²	67.71	-7.03
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.6	7.5	7.5	354	74.1	56.6	41.4	55.0	48.6	41.1
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.6	7.5								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	110		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	126	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.8	354	68.0	70.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-0.8			

Zone Checksums

By HDR

120 MECH/ELEC ROOM

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 17
Outside Air: OADB/WB/HR: 94 / 75 / 105

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	393	0	393	13
Glass Solar	0	0	0	0
Glass/Door Cond	115	0	115	4
Wall Cond	1,546	0	1,546	50
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	550		550	18
Sub Total ==>	2,603	0	2,603	85
Internal Loads				
Lights	459	0	459	15
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	459	0	459	15
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			9	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	3,062	0	3,071	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	393	14
Glass Solar	0	0
Glass/Door Cond	115	4
Wall Cond	1,546	56
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	244	9
Sub Total ==>	2,298	83
Internal Loads		
Lights	459	17
People	0	0
Misc	0	0
Sub Total ==>	459	17
Ceiling Load	0	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	2,757	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	-145	-145	8.58
Glass Solar	0	0	0.00
Glass/Door Cond	-228	-228	13.51
Wall Cond	-788	-788	46.67
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	0.00	0.00
Infiltration	-527	-527	31.24
Sub Total ==>	-1,688	-1,688	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	0	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,688	-1,688	100.00

TEMPERATURES

	Cooling	Heating
SADB	64.1	64.8
Ra Plenum	80.0	55.0
Return	80.0	55.0
Ret/OA	80.0	55.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	157	157
Terminal	157	157
Main Fan	157	157
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	16	16
MinStop/Rh	0	0
Return	173	173
Exhaust	16	16
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.87	0.87
cfm/ton	611.68	
ft²/ton	703.29	
Btu/hr·ft²	17.06	-9.38
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	0.3	3.1	2.8	157	80.1	66.6	77.5	64.1	60.7	74.8
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.3	3.1								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	180		
Part	0		
Int Door	0		
ExFlr	0		
Roof	180	0	0
Wall	297	0	0
Ext Door	21	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.7	157	55.0	64.8
Aux Htg	0.0	0	0.0	0.0
Preheat	-1.6	157	55.0	64.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-1.7			

Zone Checksums

By HDR

ATTIC

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 16
Outside Air: OADB/WB/HR: 95 / 76 / 107

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	9,743	9,743	57
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	7,601	97	7,698	45
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	-258.51	0.00	-258.51	-1.50
Infiltration	0		0	0
Sub Total ==>	7,342	9,841	17,183	100
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	4,373	-4,373	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	11,715	5,468	17,183	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	8,820	73
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	-270.53	-2.23
Infiltration	0	0
Sub Total ==>	8,550	70
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load	3,608	30
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	12,158	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-3,645	-12.20
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-2,510	-2,549	-8.53
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	17,802.80	17,802.80	59.58
Infiltration	0	0	0.00
Sub Total ==>	15,293	11,609	38.85
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	5,452	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		9,135	30.57
System Plenum Heat		9,135	30.57
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	20,744	29,879	100.00

TEMPERATURES

	Cooling	Heating
SADB	85.0	85.0
Ra Plenum	87.9	48.7
Return	87.9	48.7
Ret/OA	89.0	45.3
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	0
Terminal	0	0
Main Fan	0	0
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	0	0
Return	0	0
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	14.5	14.5
cfm/ft²	0.00	0.00
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	0.00
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	4,710		
Part	0		
Int Door	0		
ExFlr	4,723		
Roof	4,745	0	0
Wall	1,152	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	0.0	0	57.0	85.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	45.3	84.7
Reheat	0.0	0	57.0	85.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	0.0			

Zone Checksums

By HDR

HALLWAY

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 96 / 77 / 111

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	291	0	291	2
Glass/Door Cond	452	0	452	3
Wall Cond	1,520	501	2,021	12
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	474.64	474.64	2.80
Infiltration	1,578		1,578	9
Sub Total ==>	3,842	976	4,817	28
Internal Loads				
Lights	735	735	1,469	9
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	735	735	1,469	9
Ceiling Load	1,579	-1,579	0	0
Ventilation Load	0	0	4,794	28
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			2,520	15
Ov/Undr Sizing	3,200		3,200	19
Exhaust Heat		0	0	0
Sup. Fan Heat			129	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	9,355	131	16,928	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 11
OADB: 88

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	499	5
Glass/Door Cond	257	3
Wall Cond	2,437	27
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	413	5
Sub Total ==>	3,605	39
Internal Loads		
Lights	787	9
People	0	0
Misc	0	0
Sub Total ==>	787	9
Ceiling Load	1,571	17
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	3,200	35
Grand Total ==>	9,163	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-860	-860	4.95
Wall Cond	-1,212	-1,562	8.98
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-3,396.08	19.53
Infiltration	-1,308	-1,308	7.52
Sub Total ==>	-3,381	-7,126	40.99
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-2,155	0	0.00
Ventilation Load	0	-3,973	22.85
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-4,481	25.77
System Plenum Heat		-1,806	10.39
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-5,536	-17,387	100.00

TEMPERATURES

	Cooling	Heating
SADB	54.9	79.5
Ra Plenum	82.1	56.9
Return	74.0	68.0
Ret/OA	78.3	59.7
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	434	434
Terminal	434	434
Main Fan	434	434
Sec Fan	0	0
Nom Vent	84	84
AHU Vent	84	84
Infil	28	28
MinStop/Rh	434	434
Return	462	462
Exhaust	112	112
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	19.3	19.3
cfm/ft²	0.71	0.71
cfm/ton	280.10	
ft²/ton	396.57	
Btu/hr·ft²	30.26	-26.77
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	1.6	18.6	12.1	434	78.3	65.1	72.6	52.1	50.5	52.7
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	1.6	18.6								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	615		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	462	20	4
Ext Door	33	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-16.5	434	52.1	79.5
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-11.3	434	50.4	74.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-16.5			

Room Checksums

By HDR

100 VESTIBULE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 0 / 0
Outside Air: OADB/WB/HR: 0 / 0 / 0

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	0		0	0
Sub Total ==>	0	0	0	0
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	0	0	0	100.00

CLG SPACE PEAK

Mo/Hr: 0 / 0
OADB: 0

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load	0	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	0	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-80	3.93
Glass Solar	0	0	0.00
Glass/Door Cond	-751	-751	37.06
Wall Cond	-766	-1,000	49.36
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	0.00	0.00
Infiltration	-196	-196	9.66
Sub Total ==>	-1,713	-2,027	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-314	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-2,027	-2,027	100.00

TEMPERATURES

	Cooling	Heating
SADB	0.0	125.0
Ra Plenum	0.0	57.2
Return	0.0	68.0
Ret/OA	0.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	32
Terminal	0	32
Main Fan	0	32
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	4
MinStop/Rh	0	0
Return	0	36
Exhaust	0	4
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.00	0.35
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	-22.03
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	92		
Part	0		
Int Door	0		
ExFlr	0		
Roof	92	0	0
Wall	303	20	7
Ext Door	26	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.0	32	68.0	125.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.0			

Room Checksums

By HDR

101 LOBBY

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 17
Outside Air: OADB/WB/HR: 94 / 75 / 105

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	2,453	0	2,453	15
Glass/Door Cond	312	0	312	2
Wall Cond	3,204	1,071	4,275	26
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-170.88	-170.88	-1.06
Infiltration	1,965		1,965	12
Sub Total ==>	7,935	900	8,835	55
Internal Loads				
Lights	1,101	1,101	2,201	14
People	5,400	0	5,400	33
Misc	1,596	0	1,596	10
Sub Total ==>	8,096	1,101	9,197	57
Ceiling Load	3,201	-3,201	0	0
Ventilation Load	-2,111	0	-2,111	-13
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			247	2
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	17,120	-1,200	16,168	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	2,453	16
Glass/Door Cond	312	2
Wall Cond	3,204	21
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	846	6
Sub Total ==>	6,816	45
Internal Loads		
Lights	1,101	7
People	3,000	20
Misc	1,596	11
Sub Total ==>	5,696	38
Ceiling Load	3,201	21
Ventilation Load	-530	-3
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	15,182	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-636	-636	4.69
Wall Cond	-1,183	-1,454	10.73
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-1,506.74	11.12
Infiltration	-1,829	-1,829	13.50
Sub Total ==>	-3,648	-5,426	40.03
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-4,477	0	0.00
Ventilation Load	530	530	-3.91
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-4,453	32.85
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-4,206	31.03
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-7,595	-13,555	100.00

TEMPERATURES

	Cooling	Heating
SADB	57.5	76.2
Ra Plenum	85.8	51.6
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	835	835
Terminal	835	835
Main Fan	835	835
Sec Fan	0	0
Nom Vent	240	240
AHU Vent	240	240
Infil	39	39
MinStop/Rh	0	0
Return	1,113	1,113
Exhaust	279	279
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	28.8	28.8
cfm/ft²	0.97	0.97
cfm/ton	291.69	
ft²/ton	300.53	
Btu/hr·ft²	39.93	-15.61
No. People	12.0	14.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	1.4	16.2	14.2	835	74.3	61.8	63.4	57.5	55.2	62.1
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	1.5	18.2	8.6	240	82.3	73.3	110.6	50.0	49.9	53.9
Total	2.9	34.3								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	860		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	462	36	8
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-7.6	835	68.0	76.2
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-5.8	240	50.0	72.0
Total	-13.4			

Room Checksums

By HDR

102 WOMENS RR

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 6 / 19
Outside Air: OADB/WB/HR: 87 / 69 / 79

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	848	259	1,107	86
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	13.67	13.67	1.07
Infiltration	0		0	0
Sub Total ==>	848	273	1,121	87
Internal Loads				
Lights	72	72	145	11
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	72	72	145	11
Ceiling Load	228	-228	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			16	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	1,148	118	1,282	100.00

CLG SPACE PEAK

Mo/Hr: 6 / 19
OADB: 87

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	848	74
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	848	74
Internal Loads		
Lights	72	6
People	0	0
Misc	0	0
Sub Total ==>	72	6
Ceiling Load	228	20
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	1,148	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-291	-351	45.12
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-122.64	15.75
Infiltration	0	0	0.00
Sub Total ==>	-291	-474	60.88
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-364	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-305	39.12
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-656	-778	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	78.9
Ra Plenum	84.3	51.6
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	55	55
Terminal	55	55
Main Fan	55	55
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	0	0
Return	55	55
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.78	0.78
cfm/ton	512.10	
ft²/ton	655.29	
Btu/hr·ft²	18.31	-9.37
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.1	1.3	1.3	55	74.3	61.8	63.4	55.0	53.7	60.2
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.1	1.3								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	70		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	102	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.7	55	68.0	78.9
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-0.7			

Room Checksums

By HDR

103 MENS RR

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 1 / 9
Outside Air: OADB/WB/HR: 39 / 34 / 22

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	80.21	80.21	33.40
Infiltration	0		0	0
Sub Total ==>	0	80	80	33
Internal Loads				
Lights	78	78	155	65
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	78	78	155	65
Ceiling Load	131	-131	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			5	2
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	209	27	240	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 12
OADB: 91

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	84	26
People	0	0
Misc	0	0
Sub Total ==>	84	26
Ceiling Load	243	74
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	327	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-113.88	25.18
Infiltration	0	0	0.00
Sub Total ==>	0	-114	25.18
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-338	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-338	74.82
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-338	-452	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	87.7
Ra Plenum	80.4	51.6
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	16	16
Terminal	16	16
Main Fan	16	16
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	0	0
Return	16	16
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.24	0.24
cfm/ton	779.15	
ft²/ton	3,248.92	
Btu/hr·ft²	3.69	-5.21
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.2	0.2	16	74.3	61.8	63.4	55.0	54.5	63.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.2								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	65		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.3	16	68.0	87.7
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-0.3			

Room Checksums

By HDR

104 WOMENS RR

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 6 / 19
Outside Air: OADB/WB/HR: 87 / 69 / 79

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	868	265	1,133	87
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	13.28	13.28	1.02
Infiltration	0		0	0
Sub Total ==>	868	279	1,146	88
Internal Loads				
Lights	70	70	141	11
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	70	70	141	11
Ceiling Load	221	-221	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			16	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	1,159	128	1,304	100.00

CLG SPACE PEAK

Mo/Hr: 6 / 19
OADB: 87

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	868	75
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	868	75
Internal Loads		
Lights	70	6
People	0	0
Misc	0	0
Sub Total ==>	70	6
Ceiling Load	221	19
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	1,159	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-298	-360	46.61
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-119.14	15.45
Infiltration	0	0	0.00
Sub Total ==>	-298	-479	62.05
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-354	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-293	37.95
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-652	-771	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	78.7
Ra Plenum	84.3	51.6
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	55	55
Terminal	55	55
Main Fan	55	55
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	0	0
Return	55	55
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.81	0.81
cfm/ton	508.57	
ft²/ton	625.98	
Btu/hr·ft²	19.17	-9.59
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.1	1.3	1.3	55	74.3	61.8	63.4	55.0	53.7	60.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.1	1.3								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	68		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	104	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.7	55	68.0	78.7
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-0.7			

Room Checksums

By HDR

105 MENS RR

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 1 / 9
Outside Air: OADB/WB/HR: 39 / 34 / 22

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	76.51	76.51	33.40
Infiltration	0		0	0
Sub Total ==>	0	77	77	33
Internal Loads				
Lights	74	74	148	65
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	74	74	148	65
Ceiling Load	125	-125	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			4	2
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
***Grand Total* ==>**	199	25	229	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 12
OADB: 91

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	80	26
People	0	0
Misc	0	0
Sub Total ==>	80	26
Ceiling Load	232	74
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
***Grand Total* ==>**	312	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-108.63	25.18
Infiltration	0	0	0.00
Sub Total ==>	0	-109	25.18
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-323	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-323	74.82
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
***Grand Total* ==>**	-323	-431	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	87.7
Ra Plenum	80.4	51.6
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	15	15
Terminal	15	15
Main Fan	15	15
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	0	0
Return	15	15
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.24	0.24
cfm/ton	779.16	
ft²/ton	3,248.95	
Btu/hr·ft²	3.69	-5.21
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.2	0.2	15	74.3	61.8	63.4	55.0	54.5	63.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.2								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	62		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.3	15	68.0	87.7
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-0.3			

Room Checksums

By HDR

106 VCC OFFICE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 4 / 11
Outside Air: OADB/WB/HR: 70 / 58 / 55

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	56.29	56.29	1.59
Infiltration	0		0	0
Sub Total ==>	0	56	56	2
Internal Loads				
Lights	531	531	1,062	30
People	900	0	900	25
Misc	1,596	0	1,596	45
Sub Total ==>	3,027	531	3,558	101
Ceiling Load	1,380	-1,380	0	0
Ventilation Load	-139	0	-139	-4
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			57	2
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	4,268	-792	3,533	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	531	13
People	500	12
Misc	1,596	39
Sub Total ==>	2,627	65
Ceiling Load	1,544	38
Ventilation Load	-110	-3
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	4,061	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-727.09	19.63
Infiltration	0	0	0.00
Sub Total ==>	0	-727	19.63
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-2,160	0	0.00
Ventilation Load	110	110	-2.98
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-928	25.04
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-2,160	58.31
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-2,050	-3,705	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	77.6
Ra Plenum	84.5	51.6
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	194	194
Terminal	194	194
Main Fan	194	194
Sec Fan	0	0
Nom Vent	50	50
AHU Vent	50	50
Infil	0	0
MinStop/Rh	0	0
Return	244	244
Exhaust	50	50
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	25.8	25.8
cfm/ft²	0.47	0.47
cfm/ton	317.30	
ft²/ton	680.46	
Btu/hr·ft²	17.64	-7.87
No. People	2.0	4.8/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.3	3.5	3.2	194	74.3	61.8	63.4	55.0	54.5	63.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.3	3.8	1.8	50	82.3	73.3	110.6	50.0	49.9	53.9
Total	0.6	7.3								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	415		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.1	194	68.0	77.6
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-1.2	50	50.0	72.0
Total	-3.3			

Room Checksums

By HDR

107 JANITORS

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 1 / 9
Outside Air: OADB/WB/HR: 39 / 34 / 22

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	80.21	80.21	33.40
Infiltration	0		0	0
Sub Total ==>	0	80	80	33
Internal Loads				
Lights	78	78	155	65
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	78	78	155	65
Ceiling Load	131	-131	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			5	2
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	209	27	240	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 12
OADB: 91

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	84	26
People	0	0
Misc	0	0
Sub Total ==>	84	26
Ceiling Load	243	74
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	327	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-113.88	25.18
Infiltration	0	0	0.00
Sub Total ==>	0	-114	25.18
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-338	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-338	74.82
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-338	-452	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	87.7
Ra Plenum	80.4	51.6
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	16	16
Terminal	16	16
Main Fan	16	16
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	0	0
Return	16	16
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.24	0.24
cfm/ton	779.15	
ft²/ton	3,248.92	
Btu/hr·ft²	3.69	-5.21
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.2	0.2	16	74.3	61.8	63.4	55.0	54.5	63.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.2								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	65		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.3	16	68.0	87.7
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-0.3			

Room Checksums

By HDR

108 STORAGE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 6 / 12
Outside Air: OADB/WB/HR: 89 / 71 / 85

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-16.98	-16.98	2.25
Infiltration	0		0	0
Sub Total ==>	0	-17	-17	2
Internal Loads				
Lights	110	110	220	-29
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	110	110	220	-29
Ceiling Load	209	-209	0	0
Ventilation Load	-963	0	-963	127
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			4	-1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	-644	-115	-756	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 12
OADB: 91

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	110	-971
People	0	0
Misc	0	0
Sub Total ==>	110	-971
Ceiling Load	210	-1,848
Ventilation Load	-331	2,919
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	-11	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-148.92	10.57
Infiltration	0	0	0.00
Sub Total ==>	0	-149	10.57
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-442	0	0.00
Ventilation Load	110	110	-7.84
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-928	65.86
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-442	31.41
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-332	-1,409	100.00

TEMPERATURES

	Cooling	Heating
SADB	76.0	90.0
Ra Plenum	85.8	51.6
Return	78.0	68.0
Ret/OA	78.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	14	14
Terminal	14	14
Main Fan	14	14
Sec Fan	0	0
Nom Vent	50	50
AHU Vent	50	50
Infil	0	0
MinStop/Rh	0	0
Return	64	64
Exhaust	50	50
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	365.9	365.9
cfm/ft²	0.16	0.16
cfm/ton	41.74	
ft²/ton	259.64	
Btu/hr·ft²	46.22	-18.20
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.0	0.0	14	0.0	0.0	72.5	0.0	0.0	72.5
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.3	3.9	1.9	50	84.9	74.0	110.6	50.0	49.9	53.9
Total	0.3	3.9								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	85		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.3	14	68.0	90.0
Aux Htg	0.0	0	0.0	0.0
Preheat	-0.1	14	68.0	75.7
Humidif	0.0	0	0.0	0.0
Opt Vent	-1.2	50	50.0	72.0
Total	-1.6			

Room Checksums

By HDR

109 VESTIBULE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 0 / 0
Outside Air: OADB/WB/HR: 0 / 0 / 0

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	0		0	0
Sub Total ==>	0	0	0	0
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	0	0	0	100.00

CLG SPACE PEAK

Mo/Hr: 0 / 0
OADB: 0

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load	0	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	0	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-751	-751	28.34
Wall Cond	-598	-777	29.31
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-548.99	20.72
Infiltration	-255	-255	9.63
Sub Total ==>	-1,604	-2,332	88.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-497	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-318	12.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-2,101	-2,650	100.00

TEMPERATURES

	Cooling	Heating
SADB	0.0	125.0
Ra Plenum	0.0	54.9
Return	0.0	68.0
Ret/OA	0.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	33
Terminal	0	33
Main Fan	0	33
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	5
MinStop/Rh	0	0
Return	0	39
Exhaust	0	5
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.00	0.28
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	-17.51
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	120		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	245	20	8
Ext Door	26	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.1	33	68.0	125.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.1			

Room Checksums

By HDR

110 MMT CARRIER

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 8 / 17
Outside Air: OADB/WB/HR: 89 / 73 / 96

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	1,957	597	2,554	51
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-26.00	-26.00	-0.52
Infiltration	0		0	0
Sub Total ==>	1,957	571	2,528	50
Internal Loads				
Lights	293	293	586	12
People	900	0	900	18
Misc	952	0	952	19
Sub Total ==>	2,145	293	2,438	48
Ceiling Load	833	-833	0	0
Ventilation Load	-3	0	-3	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			64	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	4,933	31	5,028	100.00

CLG SPACE PEAK

Mo/Hr: 10 / 17
OADB: 73

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	2,177	48
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	2,177	48
Internal Loads		
Lights	293	6
People	500	11
Misc	952	21
Sub Total ==>	1,745	38
Ceiling Load	733	16
Ventilation Load	-110	-2
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	4,545	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-627	-756	24.84
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-402.96	13.23
Infiltration	0	0	0.00
Sub Total ==>	-627	-1,159	38.07
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,197	0	0.00
Ventilation Load	110	110	-3.63
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-928	30.47
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-1,068	35.09
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,714	-3,045	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	75.2
Ra Plenum	85.4	51.6
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	217	217
Terminal	217	217
Main Fan	217	217
Sec Fan	0	0
Nom Vent	50	50
AHU Vent	50	50
Infil	0	0
MinStop/Rh	0	0
Return	267	267
Exhaust	50	50
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	23.1	23.1
cfm/ft²	0.94	0.94
cfm/ton	294.89	
ft²/ton	313.16	
Btu/hr·ft²	38.32	-12.74
No. People	2.0	8.7/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.4	5.0	4.5	217	74.3	61.8	63.4	55.0	53.8	60.6
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.3	3.8	1.8	50	82.3	73.3	110.6	50.0	49.9	53.9
Total	0.7	8.8								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	230		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	220	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.7	217	68.0	75.2
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-1.2	50	50.0	72.0
Total	-2.9			

Room Checksums

By HDR

111 TRAF CHECK IN

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 4 / 11
Outside Air: OADB/WB/HR: 70 / 58 / 55

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	21.70	21.70	1.67
Infiltration	0		0	0
Sub Total ==>	0	22	22	2
Internal Loads				
Lights	205	205	410	31
People	450	0	450	35
Misc	479	0	479	37
Sub Total ==>	1,133	205	1,338	103
Ceiling Load	532	-532	0	0
Ventilation Load	-79	0	-79	-6
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			20	2
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	1,586	-305	1,301	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	205	14
People	250	18
Misc	479	34
Sub Total ==>	933	66
Ceiling Load	595	42
Ventilation Load	-110	-8
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	1,418	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-280.32	14.52
Infiltration	0	0	0.00
Sub Total ==>	0	-280	14.52
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-833	0	0.00
Ventilation Load	110	110	-5.72
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-928	48.06
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-833	43.14
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-722	-1,931	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	77.7
Ra Plenum	84.5	51.6
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	68	68
Terminal	68	68
Main Fan	68	68
Sec Fan	0	0
Nom Vent	50	50
AHU Vent	50	50
Infil	0	0
MinStop/Rh	0	0
Return	118	118
Exhaust	50	50
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	74.0	74.0
cfm/ft²	0.42	0.42
cfm/ton	159.48	
ft²/ton	377.49	
Btu/hr·ft²	31.79	-12.11
No. People	1.0	6.3/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	0.1	1.3	1.1	68	74.3	61.8	63.4	55.0	54.5	63.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.3	3.8	1.8	50	82.3	73.3	110.6	50.0	49.9	53.9
Total	0.4	5.1								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	160		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.7	68	68.0	77.7
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-1.2	50	50.0	72.0
Total	-1.9			

Room Checksums

By HDR

112 OPEN OFFICE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 9 / 11
Outside Air: OADB/WB/HR: 79 / 64 / 69

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	3,428	0	3,428	20
Glass/Door Cond	36	0	36	0
Wall Cond	3,990	1,243	5,233	31
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	83.39	83.39	0.50
Infiltration	0		0	0
Sub Total ==>	7,454	1,327	8,781	52
Internal Loads				
Lights	943	943	1,886	11
People	2,700	0	2,700	16
Misc	4,126	0	4,126	25
Sub Total ==>	7,769	943	8,712	52
Ceiling Load	2,480	-2,480	0	0
Ventilation Load	-1,061	0	-1,061	-6
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			341	2
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	16,642	-211	16,773	100.00

CLG SPACE PEAK

Mo/Hr: 9 / 11
OADB: 79

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	3,428	21
Glass/Door Cond	36	0
Wall Cond	3,990	25
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	7,454	46
Internal Loads		
Lights	943	6
People	1,500	9
Misc	4,126	25
Sub Total ==>	6,569	40
Ceiling Load	2,480	15
Ventilation Load	-265	-2
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	16,238	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-636	-636	6.52
Wall Cond	-2,014	-2,456	25.16
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-1,296.50	13.28
Infiltration	0	0	0.00
Sub Total ==>	-2,650	-4,388	44.96
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-3,852	0	0.00
Ventilation Load	265	265	-2.72
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-2,227	22.81
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-3,410	34.94
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-6,237	-9,760	100.00

TEMPERATURES

	Cooling	Heating
SADB	61.2	72.9
Ra Plenum	84.6	51.6
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	1,152	1,152
Terminal	1,152	1,152
Main Fan	1,152	1,152
Sec Fan	0	0
Nom Vent	120	120
AHU Vent	120	120
Infil	0	0
MinStop/Rh	0	0
Return	1,272	1,272
Exhaust	120	120
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	10.4	10.4
cfm/ft²	1.56	1.56
cfm/ton	534.65	
ft²/ton	343.41	
Btu/hr·ft²	34.94	-12.37
No. People	6.0	8.1/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	1.4	16.8	16.4	1,152	74.3	61.8	63.4	61.2	56.9	63.1
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.8	9.1	4.3	120	82.3	73.3	110.6	50.0	49.9	53.9
Total	2.2	25.9								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	740		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	753	36	5
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-6.2	1,152	68.0	72.9
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-2.9	120	50.0	72.0
Total	-9.2			

Room Checksums

By HDR

113 CONFERENCE/TRAINING

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 4 / 11
Outside Air: OADB/WB/HR: 70 / 58 / 55

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	47.48	47.48	0.81
Infiltration	0		0	0
Sub Total ==>	0	47	47	1
Internal Loads				
Lights	448	448	896	15
People	6,300	0	6,300	107
Misc	1,021	0	1,021	17
Sub Total ==>	7,769	448	8,217	139
Ceiling Load	1,163	-1,163	0	0
Ventilation Load	-2,455	0	-2,455	-42
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			86	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	6,478	-668	5,895	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	448	8
People	3,500	62
Misc	1,021	18
Sub Total ==>	4,969	88
Ceiling Load	1,303	23
Ventilation Load	-619	-11
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	5,653	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-613.21	8.74
Infiltration	0	0	0.00
Sub Total ==>	0	-613	8.74
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,822	0	0.00
Ventilation Load	619	619	-8.82
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-5,196	74.09
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-1,822	25.98
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,203	-7,012	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.3	71.8
Ra Plenum	84.5	51.6
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	290	290
Terminal	290	290
Main Fan	290	290
Sec Fan	0	0
Nom Vent	280	280
AHU Vent	280	280
Infil	0	0
MinStop/Rh	0	0
Return	570	570
Exhaust	280	280
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	96.7	96.7
cfm/ft²	0.83	0.83
cfm/ton	128.25	
ft²/ton	155.01	
Btu/hr·ft²	77.41	-22.88
No. People	14.0	40.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	0.5	5.9	4.9	290	74.3	61.8	63.4	56.3	54.9	62.5
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	1.8	21.2	10.0	280	82.3	73.3	110.6	50.0	49.9	53.9
Total	2.3	27.1								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	350		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.2	290	68.0	71.8
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-6.8	280	50.0	72.0
Total	-8.0			

Room Checksums

By HDR

114 BREAKROOM

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 4 / 11
Outside Air: OADB/WB/HR: 70 / 58 / 55

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	33.91	33.91	1.14
Infiltration	0		0	0
Sub Total ==>	0	34	34	1
Internal Loads				
Lights	320	320	640	22
People	787	0	787	27
Misc	1,596	0	1,596	54
Sub Total ==>	2,702	320	3,022	102
Ceiling Load	831	-831	0	0
Ventilation Load	-139	0	-139	-5
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			45	2
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	3,394	-477	2,962	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	320	10
People	437	14
Misc	1,596	50
Sub Total ==>	2,353	74
Ceiling Load	930	29
Ventilation Load	-110	-3
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	3,173	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-438.01	17.13
Infiltration	0	0	0.00
Sub Total ==>	0	-438	17.13
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,301	0	0.00
Ventilation Load	110	110	-4.32
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-928	36.29
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-1,301	50.90
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,191	-2,557	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	75.1
Ra Plenum	84.5	51.6
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	151	151
Terminal	151	151
Main Fan	151	151
Sec Fan	0	0
Nom Vent	50	50
AHU Vent	50	50
Infil	0	0
MinStop/Rh	0	0
Return	201	201
Exhaust	50	50
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	33.1	33.1
cfm/ft²	0.60	0.60
cfm/ton	268.87	
ft²/ton	444.60	
Btu/hr·ft²	26.99	-9.62
No. People	1.7	7.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.3	3.0	2.6	151	74.3	61.8	63.4	55.0	54.5	63.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.3	3.8	1.8	50	82.3	73.3	110.6	50.0	49.9	53.9
Total	0.6	6.8								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	250		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.2	151	68.0	75.1
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-1.2	50	50.0	72.0
Total	-2.4			

Room Checksums

By HDR

116 SR TRAFFIC OFFICE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 9 / 11
Outside Air: OADB/WB/HR: 79 / 64 / 69

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	1,143	0	1,143	26
Glass/Door Cond	12	0	12	0
Wall Cond	1,332	423	1,755	40
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	19.50	19.50	0.45
Infiltration	0		0	0
Sub Total ==>	2,487	442	2,929	67
Internal Loads				
Lights	220	220	441	10
People	450	0	450	10
Misc	476	0	476	11
Sub Total ==>	1,147	220	1,367	31
Ceiling Load	580	-580	0	0
Ventilation Load	-5	0	-5	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			56	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	4,208	83	4,347	100.00

CLG SPACE PEAK

Mo/Hr: 10 / 12
OADB: 70

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	1,148	29
Glass/Door Cond	-36	-1
Wall Cond	1,465	37
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	2,578	65
Internal Loads		
Lights	222	6
People	223	6
Misc	481	12
Sub Total ==>	927	23
Ceiling Load	567	14
Ventilation Load	-110	-3
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	3,961	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-212	-212	7.45
Wall Cond	-614	-750	26.33
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-303.10	10.65
Infiltration	0	0	0.00
Sub Total ==>	-826	-1,265	44.43
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-901	0	0.00
Ventilation Load	110	110	-3.88
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-928	32.59
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-765	26.87
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,616	-2,847	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	75.8
Ra Plenum	84.6	51.6
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	189	189
Terminal	189	189
Main Fan	189	189
Sec Fan	0	0
Nom Vent	50	50
AHU Vent	50	50
Infil	0	0
MinStop/Rh	0	0
Return	239	239
Exhaust	50	50
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	26.5	26.5
cfm/ft²	1.09	1.09
cfm/ton	278.48	
ft²/ton	255.26	
Btu/hr·ft²	47.01	-16.37
No. People	1.0	5.8/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.4	4.4	4.0	189	74.3	61.8	63.4	55.0	53.9	60.8
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.3	3.8	1.8	50	82.3	73.3	110.6	50.0	49.9	53.9
Total	0.7	8.1								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	173		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	231	12	5
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.6	189	68.0	75.8
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-1.2	50	50.0	72.0
Total	-2.8			

Room Checksums

By HDR

117 SR TRAFFIC OFFICE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 11
Outside Air: OADB/WB/HR: 88 / 72 / 97

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	1,392	0	1,392	24
Glass/Door Cond	116	0	116	2
Wall Cond	2,108	692	2,800	48
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-15.42	-15.42	-0.27
Infiltration	0		0	0
Sub Total ==>	3,616	677	4,293	74
Internal Loads				
Lights	248	248	497	9
People	450	0	450	8
Misc	476	0	476	8
Sub Total ==>	1,175	248	1,423	25
Ceiling Load	698	-698	0	0
Ventilation Load	3	0	3	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			73	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	5,492	227	5,792	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 11
OADB: 88

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	1,392	27
Glass/Door Cond	116	2
Wall Cond	2,108	41
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	3,616	70
Internal Loads		
Lights	248	5
People	250	5
Misc	476	9
Sub Total ==>	975	19
Ceiling Load	698	13
Ventilation Load	-110	-2
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	5,178	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-424	-424	12.23
Wall Cond	-869	-1,066	30.74
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-341.64	9.86
Infiltration	0	0	0.00
Sub Total ==>	-1,293	-1,831	52.83
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,015	0	0.00
Ventilation Load	110	110	-3.19
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-928	26.76
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-818	23.59
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-2,197	-3,467	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	76.1
Ra Plenum	85.3	51.6
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	247	247
Terminal	247	247
Main Fan	247	247
Sec Fan	0	0
Nom Vent	50	50
AHU Vent	50	50
Infil	0	0
MinStop/Rh	0	0
Return	297	297
Exhaust	50	50
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	20.3	20.3
cfm/ft²	1.27	1.27
cfm/ton	309.15	
ft²/ton	244.31	
Btu/hr·ft²	49.12	-17.50
No. People	1.0	5.1/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.5	5.8	5.5	247	74.3	61.8	63.4	55.0	53.7	60.2
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.3	3.8	1.8	50	82.3	73.3	110.6	50.0	49.9	53.9
Total	0.8	9.6								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	195		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	336	24	7
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.2	247	68.0	76.1
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-1.2	50	50.0	72.0
Total	-3.4			

Room Checksums

By HDR

118 FILE ROOM

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 6 / 11
Outside Air: OADB/WB/HR: 86 / 69 / 83

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	711	220	931	95
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-6.96	-6.96	-0.71
Infiltration	0		0	0
Sub Total ==>	711	213	924	94
Internal Loads				
Lights	115	115	229	23
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	115	115	229	23
Ceiling Load	208	-208	0	0
Ventilation Load	-183	0	-183	-19
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			8	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	851	120	979	100.00

CLG SPACE PEAK

Mo/Hr: 6 / 11
OADB: 86

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	711	101
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	711	101
Internal Loads		
Lights	115	16
People	0	0
Misc	0	0
Sub Total ==>	115	16
Ceiling Load	208	30
Ventilation Load	-331	-47
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	702	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-298	-360	20.64
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-157.68	9.05
Infiltration	0	0	0.00
Sub Total ==>	-298	-517	29.69
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-468	0	0.00
Ventilation Load	110	110	-6.34
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-928	53.27
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-407	23.38
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-656	-1,742	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	89.5
Ra Plenum	85.3	51.6
Return	78.0	68.0
Ret/OA	78.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	28	28
Terminal	28	28
Main Fan	28	28
Sec Fan	0	0
Nom Vent	50	50
AHU Vent	50	50
Infil	0	0
MinStop/Rh	0	0
Return	78	78
Exhaust	50	50
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	180.9	180.9
cfm/ft²	0.31	0.31
cfm/ton	67.61	
ft²/ton	220.09	
Btu/hr·ft²	54.52	-20.79
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.1	1.0	0.8	28	78.3	65.1	72.5	55.0	53.3	58.7
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.3	3.9	1.9	50	84.9	74.0	110.6	50.0	49.9	53.9
Total	0.4	4.9								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	90		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	104	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.7	28	68.0	89.5
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-1.2	50	50.0	72.0
Total	-1.9			

Room Checksums

By HDR

119 COMM

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 6 / 11
Outside Air: OADB/WB/HR: 86 / 69 / 83

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	892	265	1,157	16
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-10.16	-10.16	-0.14
Infiltration	0		0	0
Sub Total ==>	892	255	1,147	15
Internal Loads				
Lights	140	140	280	4
People	0	0	0	0
Misc	6,000	0	6,000	81
Sub Total ==>	6,140	140	6,280	84
Ceiling Load	395	-395	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			21	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
***Grand Total* ==>**	7,428	0	7,448	100.00

CLG SPACE PEAK

Mo/Hr: 6 / 11
OADB: 86

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	892	12
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	892	12
Internal Loads		
Lights	140	2
People	0	0
Misc	6,000	81
Sub Total ==>	6,140	83
Ceiling Load	395	5
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
***Grand Total* ==>**	7,428	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-360	-447	32.98
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-581.06	42.90
Infiltration	0	0	0.00
Sub Total ==>	-360	-1,028	75.88
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-413	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-327	24.12
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
***Grand Total* ==>**	-773	-1,354	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	70.0
Ra Plenum	85.4	56.1
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	354	354
Terminal	354	354
Main Fan	354	354
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	0	0
Return	354	354
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	3.22	3.22
cfm/ton	570.21	
ft²/ton	177.22	
Btu/hr·ft²	67.71	-7.03
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.6	7.5	7.5	354	74.1	56.6	41.4	55.0	48.6	41.1
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.6	7.5								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	110		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	126	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.8	354	68.0	70.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-0.8			

Room Checksums

By HDR

120 MECH/ELEC ROOM

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 17
Outside Air: OADB/WB/HR: 94 / 75 / 105

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	393	0	393	13
Glass Solar	0	0	0	0
Glass/Door Cond	115	0	115	4
Wall Cond	1,546	0	1,546	50
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	550		550	18
Sub Total ==>	2,603	0	2,603	85
Internal Loads				
Lights	459	0	459	15
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	459	0	459	15
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			9	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	3,062	0	3,071	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	393	14
Glass Solar	0	0
Glass/Door Cond	115	4
Wall Cond	1,546	56
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	244	9
Sub Total ==>	2,298	83
Internal Loads		
Lights	459	17
People	0	0
Misc	0	0
Sub Total ==>	459	17
Ceiling Load	0	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	2,757	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	-145	-145	8.58
Glass Solar	0	0	0.00
Glass/Door Cond	-228	-228	13.51
Wall Cond	-788	-788	46.67
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	0.00	0.00
Infiltration	-527	-527	31.24
Sub Total ==>	-1,688	-1,688	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	0	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,688	-1,688	100.00

TEMPERATURES

	Cooling	Heating
SADB	64.1	64.8
Ra Plenum	80.0	55.0
Return	80.0	55.0
Ret/OA	80.0	55.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	157	157
Terminal	157	157
Main Fan	157	157
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	16	16
MinStop/Rh	0	0
Return	173	173
Exhaust	16	16
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.87	0.87
cfm/ton	611.68	
ft²/ton	703.29	
Btu/hr·ft²	17.06	-9.38
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.3	3.1	2.8	157	80.1	66.6	77.5	64.1	60.7	74.8
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.3	3.1								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	180		
Part	0		
Int Door	0		
ExFlr	0		
Roof	180	0	0
Wall	297	0	0
Ext Door	21	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.7	157	55.0	64.8
Aux Htg	0.0	0	0.0	0.0
Preheat	-1.6	157	55.0	64.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-1.7			

Room Checksums

By HDR

ATTIC

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 16
Outside Air: OADB/WB/HR: 95 / 76 / 107

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	9,994	9,994	53
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	7,601	100	7,701	41
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	1,182.33	0.00	1,182.33	6.26
Infiltration	0		0	0
Sub Total ==>	8,783	10,094	18,877	100
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	1,451	-1,451	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	10,234	8,643	18,877	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	8,820	81
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	960.46	8.82
Infiltration	0	0
Sub Total ==>	9,781	90
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load	1,112	10
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	10,893	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-4,019	-24.66
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-2,510	-2,553	-15.66
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	9,001.88	9,001.88	55.23
Infiltration	0	0	0.00
Sub Total ==>	6,492	2,430	14.91
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	9,808	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		13,869	85.09
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	16,299	16,299	100.00

TEMPERATURES

	Cooling	Heating
SADB	85.0	45.0
Ra Plenum	86.0	51.6
Return	86.0	51.6
Ret/OA	86.0	51.6
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	0
Terminal	0	0
Main Fan	0	0
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	0	0
Return	0	0
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.00	0.00
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	0.00
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	4,710		
Part	0		
Int Door	0		
ExFlr	4,723		
Roof	4,745	0	0
Wall	1,152	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	0.0	0	0.0	0.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	51.6	84.7
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	0.0			

Room Checksums

By HDR

HALLWAY

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 11
Outside Air: OADB/WB/HR: 88 / 72 / 97

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	819	0	819	12
Glass/Door Cond	257	0	257	4
Wall Cond	2,437	822	3,259	49
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-48.62	-48.62	-0.73
Infiltration	1,065		1,065	16
Sub Total ==>	4,577	773	5,351	81
Internal Loads				
Lights	787	787	1,574	24
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	787	787	1,574	24
Ceiling Load	2,201	-2,201	0	0
Ventilation Load	-440	0	-440	-7
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			132	2
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	7,126	-641	6,618	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 11
OADB: 88

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	819	12
Glass/Door Cond	257	4
Wall Cond	2,437	36
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	413	6
Sub Total ==>	3,925	58
Internal Loads		
Lights	787	12
People	0	0
Misc	0	0
Sub Total ==>	787	12
Ceiling Load	2,201	32
Ventilation Load	-110	-2
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	6,803	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-860	-860	10.15
Wall Cond	-1,212	-1,503	17.72
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-1,077.49	12.71
Infiltration	-1,308	-1,308	15.43
Sub Total ==>	-3,381	-4,749	56.02
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-3,201	0	0.00
Ventilation Load	110	110	-1.30
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-928	10.94
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-2,911	34.34
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-6,472	-8,477	100.00

TEMPERATURES

	Cooling	Heating
SADB	60.2	81.1
Ra Plenum	85.3	51.6
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	447	447
Terminal	447	447
Main Fan	447	447
Sec Fan	0	0
Nom Vent	50	50
AHU Vent	50	50
Infil	28	28
MinStop/Rh	0	0
Return	524	524
Exhaust	78	78
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	11.2	11.2
cfm/ft²	0.73	0.73
cfm/ton	515.07	
ft²/ton	709.40	
Btu/hr·ft²	16.92	-12.50
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.6	6.6	6.3	447	74.3	61.8	63.4	60.2	56.6	63.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.3	3.8	1.8	50	82.3	73.3	110.6	50.0	49.9	53.9
Total	0.9	10.4								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	615		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	462	20	4
Ext Door	33	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-6.5	447	68.0	81.1
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-1.2	50	50.0	72.0
Total	-7.7			

Room Checksums

By HDR

100 VESTIBULE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 0 / 0
Outside Air: OADB/WB/HR: 0 / 0 / 0

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	0		0	0
Sub Total ==>	0	0	0	0
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	0	0	0	100.00

CLG SPACE PEAK

Mo/Hr: 0 / 0
OADB: 0

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load	0	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	0	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-80	3.93
Glass Solar	0	0	0.00
Glass/Door Cond	-751	-751	37.06
Wall Cond	-766	-1,000	49.36
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	0.00	0.00
Infiltration	-196	-196	9.66
Sub Total ==>	-1,713	-2,027	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-314	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-2,027	-2,027	100.00

TEMPERATURES

	Cooling	Heating
SADB	0.0	125.0
Ra Plenum	0.0	57.2
Return	0.0	68.0
Ret/OA	0.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	32
Terminal	0	32
Main Fan	0	32
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	4
MinStop/Rh	0	0
Return	0	36
Exhaust	0	4
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.00	0.35
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	-22.03
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total ft²	Glass ft²	Glass (%)
Floor	92		
Part	0		
Int Door	0		
ExFlr	0		
Roof	92	0	0
Wall	303	20	7
Ext Door	26	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.0	32	68.0	125.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.0			

Room Checksums

By HDR

101 LOBBY

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 17
Outside Air: OADB/WB/HR: 94 / 75 / 105

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	1,493	0	1,493	10
Glass/Door Cond	312	0	312	2
Wall Cond	3,204	1,071	4,276	28
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-164.71	-164.71	-1.08
Infiltration	1,969		1,969	13
Sub Total ==>	6,978	907	7,885	52
Internal Loads				
Lights	1,101	1,101	2,201	14
People	5,400	0	5,400	35
Misc	1,596	0	1,596	10
Sub Total ==>	8,096	1,101	9,197	60
Ceiling Load	3,193	-3,193	0	0
Ventilation Load	-2,088	0	-2,088	-14
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			239	2
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	16,180	-1,186	15,232	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	1,493	11
Glass/Door Cond	312	2
Wall Cond	3,204	23
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	846	6
Sub Total ==>	5,856	41
Internal Loads		
Lights	1,101	8
People	3,000	21
Misc	1,596	11
Sub Total ==>	5,696	40
Ceiling Load	3,193	22
Ventilation Load	-530	-4
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	14,215	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-636	-636	3.09
Wall Cond	-1,183	-1,455	7.06
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-1,539.19	7.47
Infiltration	-1,829	-1,829	8.88
Sub Total ==>	-3,648	-5,460	26.51
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-4,438	0	0.00
Ventilation Load	530	530	-2.57
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-7,050	-7,050	34.23
Exhaust Heat		0	0.00
OA Preheat Diff.		-4,453	21.62
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-4,166	20.22
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-14,606	-20,599	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.0	84.4
Ra Plenum	85.7	51.7
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	805	805
Terminal	805	805
Main Fan	805	805
Sec Fan	0	0
Nom Vent	240	240
AHU Vent	240	240
Infil	39	39
MinStop/Rh	81	81
Return	1,084	1,084
Exhaust	279	279
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	29.8	29.8
cfm/ft²	0.94	0.94
cfm/ton	289.24	
ft²/ton	308.95	
Btu/hr·ft²	38.84	-23.77
No. People	12.0	14.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	1.3	15.2	13.3	805	74.3	61.8	63.4	58.0	55.4	61.9
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	1.5	18.2	8.6	240	82.3	73.3	110.6	50.0	49.9	53.9
Total	2.8	33.4								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	860		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	462	36	8
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-14.6	805	68.0	84.4
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-5.8	240	50.0	72.0
Total	-20.4			

Room Checksums

By HDR

102 WOMENS RR

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 6 / 19
Outside Air: OADB/WB/HR: 87 / 69 / 79

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	848	259	1,107	86
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	14.42	14.42	1.12
Infiltration	0		0	0
Sub Total ==>	848	274	1,122	87
Internal Loads				
Lights	72	72	145	11
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	72	72	145	11
Ceiling Load	227	-227	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			19	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	1,147	119	1,286	100.00

CLG SPACE PEAK

Mo/Hr: 6 / 19
OADB: 87

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	848	74
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	848	74
Internal Loads		
Lights	72	6
People	0	0
Misc	0	0
Sub Total ==>	72	6
Ceiling Load	227	20
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	1,147	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-291	-352	26.96
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-125.28	9.61
Infiltration	0	0	0.00
Sub Total ==>	-291	-477	36.57
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-361	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-526	-526	40.34
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-301	23.09
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,179	-1,304	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.0	84.4
Ra Plenum	84.2	51.7
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	65	65
Terminal	65	65
Main Fan	65	65
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	7	7
Return	65	65
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.93	0.93
cfm/ton	606.38	
ft²/ton	653.31	
Btu/hr·ft²	18.37	-16.84
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.1	1.3	1.3	65	74.3	61.8	63.4	58.0	55.1	60.7
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.1	1.3								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	70		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	102	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.2	65	68.0	84.4
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-1.2			

Room Checksums

By HDR

103 MENS RR

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 1 / 9
Outside Air: OADB/WB/HR: 39 / 34 / 22

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	82.47	82.47	33.90
Infiltration	0		0	0
Sub Total ==>	0	82	82	34
Internal Loads				
Lights	78	78	155	64
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	78	78	155	64
Ceiling Load	129	-129	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			5	2
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
***Grand Total* ==>**	206	32	243	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 12
OADB: 91

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	84	26
People	0	0
Misc	0	0
Sub Total ==>	84	26
Ceiling Load	242	74
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
***Grand Total* ==>**	326	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-116.33	25.75
Infiltration	0	0	0.00
Sub Total ==>	0	-116	25.75
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-335	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-335	74.25
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
***Grand Total* ==>**	-335	-452	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.0	84.4
Ra Plenum	80.2	51.7
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	18	18
Terminal	18	18
Main Fan	18	18
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	2	2
Return	18	18
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.28	0.28
cfm/ton	912.43	
ft²/ton	3,207.15	
Btu/hr·ft²	3.74	-5.16
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.2	0.2	18	74.3	61.8	63.4	58.0	55.7	63.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.2								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	65		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.3	18	68.0	84.4
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-0.3			

Room Checksums

By HDR

104 WOMENS RR

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 6 / 19
Outside Air: OADB/WB/HR: 87 / 69 / 79

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	868	265	1,133	87
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	14.01	14.01	1.07
Infiltration	0		0	0
Sub Total ==>	868	279	1,147	88
Internal Loads				
Lights	70	70	141	11
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	70	70	141	11
Ceiling Load	220	-220	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			19	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	1,158	130	1,307	100.00

CLG SPACE PEAK

Mo/Hr: 6 / 19
OADB: 87

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	868	75
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	868	75
Internal Loads		
Lights	70	6
People	0	0
Misc	0	0
Sub Total ==>	70	6
Ceiling Load	220	19
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	1,158	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-298	-360	27.43
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-121.70	9.28
Infiltration	0	0	0.00
Sub Total ==>	-298	-482	36.70
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-351	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-541	-541	41.25
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-289	22.05
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,190	-1,312	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.0	84.4
Ra Plenum	84.2	51.7
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	66	66
Terminal	66	66
Main Fan	66	66
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	7	7
Return	66	66
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.96	0.96
cfm/ton	602.25	
ft²/ton	624.11	
Btu/hr·ft²	19.23	-17.51
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.1	1.3	1.3	66	74.3	61.8	63.4	58.0	55.0	60.5
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.1	1.3								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	68		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	104	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.2	66	68.0	84.4
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-1.2			

Room Checksums

By HDR

105 MENS RR

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 1 / 9
Outside Air: OADB/WB/HR: 39 / 34 / 22

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	78.67	78.67	33.91
Infiltration	0		0	0
Sub Total ==>	0	79	79	34
Internal Loads				
Lights	74	74	148	64
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	74	74	148	64
Ceiling Load	123	-123	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			5	2
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
***Grand Total* ==>**	197	30	232	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 12
OADB: 91

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	80	26
People	0	0
Misc	0	0
Sub Total ==>	80	26
Ceiling Load	231	74
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
***Grand Total* ==>**	311	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-110.96	25.75
Infiltration	0	0	0.00
Sub Total ==>	0	-111	25.75
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-320	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-320	74.25
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
***Grand Total* ==>**	-320	-431	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.0	84.4
Ra Plenum	80.2	51.7
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	18	18
Terminal	18	18
Main Fan	18	18
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	2	2
Return	18	18
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.28	0.28
cfm/ton	912.45	
ft²/ton	3,207.18	
Btu/hr·ft²	3.74	-5.16
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.2	0.2	18	74.3	61.8	63.4	58.0	55.7	63.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.2								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	62		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.3	18	68.0	84.4
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-0.3			

Room Checksums

By HDR

106 VCC OFFICE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 4 / 11
Outside Air: OADB/WB/HR: 70 / 58 / 55

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	63.33	63.33	1.79
Infiltration	0		0	0
Sub Total ==>	0	63	63	2
Internal Loads				
Lights	531	531	1,062	30
People	900	0	900	25
Misc	1,596	0	1,596	45
Sub Total ==>	3,027	531	3,558	100
Ceiling Load	1,371	-1,371	0	0
Ventilation Load	-136	0	-136	-4
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			57	2
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	4,261	-777	3,542	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	531	13
People	500	12
Misc	1,596	39
Sub Total ==>	2,627	65
Ceiling Load	1,541	38
Ventilation Load	-110	-3
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	4,057	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-742.75	20.06
Infiltration	0	0	0.00
Sub Total ==>	0	-743	20.06
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-2,142	0	0.00
Ventilation Load	110	110	-2.98
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-928	25.06
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-2,142	57.86
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-2,031	-3,702	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	77.5
Ra Plenum	84.4	51.7
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	193	193
Terminal	193	193
Main Fan	193	193
Sec Fan	0	0
Nom Vent	50	50
AHU Vent	50	50
Infil	0	0
MinStop/Rh	19	19
Return	243	243
Exhaust	50	50
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	25.9	25.9
cfm/ft²	0.47	0.47
cfm/ton	316.63	
ft²/ton	679.62	
Btu/hr·ft²	17.66	-7.82
No. People	2.0	4.8/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	0.3	3.5	3.2	193	74.3	61.8	63.4	55.0	54.5	63.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.3	3.8	1.8	50	82.3	73.3	110.6	50.0	49.9	53.9
Total	0.6	7.3								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	415		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.0	193	68.0	77.5
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-1.2	50	50.0	72.0
Total	-3.3			

Room Checksums

By HDR

107 JANITORS

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 1 / 9
Outside Air: OADB/WB/HR: 39 / 34 / 22

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	82.47	82.47	34.03
Infiltration	0		0	0
Sub Total ==>	0	82	82	34
Internal Loads				
Lights	78	78	155	64
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	78	78	155	64
Ceiling Load	129	-129	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			5	2
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	206	32	242	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 12
OADB: 91

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	84	26
People	0	0
Misc	0	0
Sub Total ==>	84	26
Ceiling Load	242	74
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	326	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-116.33	23.53
Infiltration	0	0	0.00
Sub Total ==>	0	-116	23.53
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-335	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-43	-43	8.61
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-335	67.86
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-378	-494	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	90.0
Ra Plenum	80.2	51.7
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	16	16
Terminal	16	16
Main Fan	16	16
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	2	2
Return	16	16
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.24	0.24
cfm/ton	770.39	
ft²/ton	3,218.66	
Btu/hr·ft²	3.73	-5.82
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.2	0.2	16	74.3	61.8	63.4	55.0	54.5	63.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.2								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	65		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.4	16	68.0	90.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-0.4			

Room Checksums

By HDR

108 STORAGE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 6 / 12
Outside Air: OADB/WB/HR: 89 / 71 / 85

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-16.36	-16.36	-6.65
Infiltration	0		0	0
Sub Total ==>	0	-16	-16	-7
Internal Loads				
Lights	110	110	220	90
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	110	110	220	90
Ceiling Load	208	-208	0	0
Ventilation Load	-352	0	-352	-143
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	390		390	158
Exhaust Heat		0	0	0
Sup. Fan Heat			4	2
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	356	-114	246	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 12
OADB: 91

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	110	32
People	0	0
Misc	0	0
Sub Total ==>	110	32
Ceiling Load	209	61
Ventilation Load	-331	-97
Adj Air Trans Heat	0	0
Ov/Undr Sizing	355	104
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	343	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-152.13	10.80
Infiltration	0	0	0.00
Sub Total ==>	0	-152	10.80
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-439	0	0.00
Ventilation Load	110	110	-7.84
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-928	65.89
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-439	31.15
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-328	-1,408	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	90.0
Ra Plenum	85.7	51.7
Return	78.0	68.0
Ret/OA	78.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	14	14
Terminal	14	14
Main Fan	14	14
Sec Fan	0	0
Nom Vent	50	50
AHU Vent	50	50
Infil	0	0
MinStop/Rh	1	1
Return	64	64
Exhaust	50	50
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	370.1	370.1
cfm/ft²	0.16	0.16
cfm/ton	38.64	
ft²/ton	243.15	
Btu/hr·ft²	49.35	-18.16
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.3	0.3	14	78.3	65.1	72.5	55.0	55.0	65.1
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.3	3.9	1.9	50	84.9	74.0	110.6	50.0	49.9	53.9
Total	0.4	4.2								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	85		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.3	14	68.0	90.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-1.2	50	50.0	72.0
Total	-1.5			

Room Checksums

By HDR

109 VESTIBULE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 0 / 0
Outside Air: OADB/WB/HR: 0 / 0 / 0

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	0		0	0
Sub Total ==>	0	0	0	0
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	0	0	0	100.00

CLG SPACE PEAK

Mo/Hr: 0 / 0
OADB: 0

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load	0	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	0	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-751	-751	28.40
Wall Cond	-598	-778	29.40
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-548.99	20.76
Infiltration	-255	-255	9.65
Sub Total ==>	-1,604	-2,333	88.20
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-492	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-312	11.80
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-2,096	-2,645	100.00

TEMPERATURES

	Cooling	Heating
SADB	0.0	125.0
Ra Plenum	0.0	55.1
Return	0.0	68.0
Ret/OA	0.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	33
Terminal	0	33
Main Fan	0	33
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	5
MinStop/Rh	0	0
Return	0	39
Exhaust	0	5
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.00	0.28
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	-17.47
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	120		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	245	20	8
Ext Door	26	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.1	33	68.0	125.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.1			

Room Checksums

By HDR

110 MMT CARRIER

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 8 / 17
Outside Air: OADB/WB/HR: 89 / 73 / 96

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	1,957	597	2,554	51
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-23.70	-23.70	-0.47
Infiltration	0		0	0
Sub Total ==>	1,957	573	2,531	50
Internal Loads				
Lights	293	293	586	12
People	900	0	900	18
Misc	952	0	952	19
Sub Total ==>	2,145	293	2,438	48
Ceiling Load	830	-830	0	0
Ventilation Load	-3	0	-3	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			64	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	4,930	36	5,030	100.00

CLG SPACE PEAK

Mo/Hr: 10 / 17
OADB: 73

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	2,177	48
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	2,177	48
Internal Loads		
Lights	293	6
People	500	11
Misc	952	21
Sub Total ==>	1,745	38
Ceiling Load	728	16
Ventilation Load	-110	-2
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	4,540	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-627	-757	24.87
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-411.64	13.53
Infiltration	0	0	0.00
Sub Total ==>	-627	-1,169	38.40
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,187	0	0.00
Ventilation Load	110	110	-3.63
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-928	30.49
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-1,057	34.74
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,704	-3,043	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	75.1
Ra Plenum	85.4	51.7
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	216	216
Terminal	216	216
Main Fan	216	216
Sec Fan	0	0
Nom Vent	50	50
AHU Vent	50	50
Infil	0	0
MinStop/Rh	22	22
Return	266	266
Exhaust	50	50
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	23.1	23.1
cfm/ft²	0.94	0.94
cfm/ton	294.45	
ft²/ton	313.07	
Btu/hr·ft²	38.33	-12.69
No. People	2.0	8.7/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	0.4	5.0	4.5	216	74.3	61.8	63.4	55.0	53.8	60.5
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.3	3.8	1.8	50	82.3	73.3	110.6	50.0	49.9	53.9
Total	0.7	8.8								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	230		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	220	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.7	216	68.0	75.1
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-1.2	50	50.0	72.0
Total	-2.9			

Room Checksums

By HDR

111 TRAF CHECK IN

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 6 / 17
Outside Air: OADB/WB/HR: 92 / 72 / 86

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-27.15	-27.15	-2.19
Infiltration	0		0	0
Sub Total ==>	0	-27	-27	-2
Internal Loads				
Lights	205	205	410	33
People	450	0	450	36
Misc	479	0	479	39
Sub Total ==>	1,133	205	1,338	108
Ceiling Load	590	-590	0	0
Ventilation Load	-93	0	-93	-7
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			20	2
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	1,631	-412	1,238	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	205	14
People	250	18
Misc	479	34
Sub Total ==>	933	66
Ceiling Load	594	42
Ventilation Load	-110	-8
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	1,417	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-286.36	14.84
Infiltration	0	0	0.00
Sub Total ==>	0	-286	14.84
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-826	0	0.00
Ventilation Load	110	110	-5.72
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-928	48.09
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-826	42.80
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-715	-1,929	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	77.6
Ra Plenum	85.6	51.7
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	68	68
Terminal	68	68
Main Fan	68	68
Sec Fan	0	0
Nom Vent	50	50
AHU Vent	50	50
Infil	0	0
MinStop/Rh	7	7
Return	118	118
Exhaust	50	50
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	74.0	74.0
cfm/ft²	0.42	0.42
cfm/ton	161.31	
ft²/ton	382.18	
Btu/hr·ft²	31.40	-12.06
No. People	1.0	6.3/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.1	1.2	1.0	68	74.3	61.8	63.4	55.0	54.5	63.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.3	3.8	1.8	50	82.3	73.3	110.6	50.0	49.9	53.9
Total	0.4	5.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	160		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.7	68	68.0	77.6
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-1.2	50	50.0	72.0
Total	-1.9			

Room Checksums

By HDR

112 OPEN OFFICE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 9 / 11
Outside Air: OADB/WB/HR: 79 / 64 / 69

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	2,086	0	2,086	13
Glass/Door Cond	36	0	36	0
Wall Cond	3,990	1,245	5,234	32
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	99.18	99.18	0.61
Infiltration	0		0	0
Sub Total ==>	6,113	1,344	7,456	46
Internal Loads				
Lights	943	943	1,886	12
People	2,700	0	2,700	17
Misc	4,126	0	4,126	26
Sub Total ==>	7,769	943	8,712	54
Ceiling Load	2,461	-2,461	0	0
Ventilation Load	-232	0	-232	-1
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			211	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	16,111	-175	16,148	100.00

CLG SPACE PEAK

Mo/Hr: 8 / 12
OADB: 87

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	1,562	10
Glass/Door Cond	169	1
Wall Cond	4,347	29
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	6,078	41
Internal Loads		
Lights	951	6
People	1,340	9
Misc	4,171	28
Sub Total ==>	6,462	43
Ceiling Load	2,697	18
Ventilation Load	-265	-2
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	14,971	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-636	-636	5.73
Wall Cond	-2,014	-2,458	22.13
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-1,324.42	11.92
Infiltration	0	0	0.00
Sub Total ==>	-2,650	-4,419	39.78
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-3,819	0	0.00
Ventilation Load	265	265	-2.39
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-1,353	-1,353	12.18
Exhaust Heat		0	0.00
OA Preheat Diff.		-2,227	20.05
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-3,375	30.38
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-7,557	-11,108	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	77.6
Ra Plenum	84.5	51.7
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	713	713
Terminal	713	713
Main Fan	713	713
Sec Fan	0	0
Nom Vent	120	120
AHU Vent	120	120
Infil	0	0
MinStop/Rh	71	71
Return	833	833
Exhaust	120	120
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	16.8	16.8
cfm/ft²	0.96	0.96
cfm/ton	339.29	
ft²/ton	351.91	
Btu/hr·ft²	34.10	-14.15
No. People	6.0	8.1/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	1.4	16.2	14.9	713	74.3	61.8	63.4	55.0	54.0	61.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.8	9.1	4.3	120	82.3	73.3	110.6	50.0	49.9	53.9
Total	2.1	25.2								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	740		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	753	36	5
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-7.6	713	68.0	77.6
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-2.9	120	50.0	72.0
Total	-10.5			

Room Checksums

By HDR

113 CONFERENCE/TRAINING

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 4 / 11
Outside Air: OADB/WB/HR: 70 / 58 / 55

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	53.41	53.41	0.90
Infiltration	0		0	0
Sub Total ==>	0	53	53	1
Internal Loads				
Lights	448	448	896	15
People	6,300	0	6,300	106
Misc	1,021	0	1,021	17
Sub Total ==>	7,769	448	8,217	139
Ceiling Load	1,156	-1,156	0	0
Ventilation Load	-2,438	0	-2,438	-41
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			86	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	6,487	-655	5,918	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	448	8
People	3,500	62
Misc	1,021	18
Sub Total ==>	4,969	88
Ceiling Load	1,300	23
Ventilation Load	-619	-11
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	5,650	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-626.41	8.94
Infiltration	0	0	0.00
Sub Total ==>	0	-626	8.94
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,806	0	0.00
Ventilation Load	619	619	-8.82
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-5,196	74.12
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-1,806	25.77
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,188	-7,010	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.3	71.7
Ra Plenum	84.4	51.7
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	289	289
Terminal	289	289
Main Fan	289	289
Sec Fan	0	0
Nom Vent	280	280
AHU Vent	280	280
Infil	0	0
MinStop/Rh	29	29
Return	569	569
Exhaust	280	280
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	96.8	96.8
cfm/ft²	0.83	0.83
cfm/ton	128.06	
ft²/ton	154.88	
Btu/hr·ft²	77.48	-22.83
No. People	14.0	40.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.5	5.9	4.9	289	74.3	61.8	63.4	56.3	54.8	62.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	1.8	21.2	10.0	280	82.3	73.3	110.6	50.0	49.9	53.9
Total	2.3	27.1								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	350		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.2	289	68.0	71.7
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-6.8	280	50.0	72.0
Total	-8.0			

Room Checksums

By HDR

114 BREAKROOM

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 4 / 11
Outside Air: OADB/WB/HR: 70 / 58 / 55

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	38.15	38.15	1.28
Infiltration	0		0	0
Sub Total ==>	0	38	38	1
Internal Loads				
Lights	320	320	640	22
People	787	0	787	26
Misc	1,596	0	1,596	54
Sub Total ==>	2,702	320	3,022	102
Ceiling Load	826	-826	0	0
Ventilation Load	-135	0	-135	-5
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			45	2
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	3,393	-468	2,970	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	320	10
People	437	14
Misc	1,596	50
Sub Total ==>	2,353	74
Ceiling Load	928	29
Ventilation Load	-110	-3
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	3,170	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-447.44	17.51
Infiltration	0	0	0.00
Sub Total ==>	0	-447	17.51
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,290	0	0.00
Ventilation Load	110	110	-4.32
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-928	36.31
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-1,290	50.50
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,180	-2,555	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	75.1
Ra Plenum	84.4	51.7
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	151	151
Terminal	151	151
Main Fan	151	151
Sec Fan	0	0
Nom Vent	50	50
AHU Vent	50	50
Infil	0	0
MinStop/Rh	15	15
Return	201	201
Exhaust	50	50
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	33.1	33.1
cfm/ft²	0.60	0.60
cfm/ton	268.39	
ft²/ton	444.09	
Btu/hr·ft²	27.02	-9.58
No. People	1.7	7.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.3	3.0	2.7	151	74.3	61.8	63.4	55.0	54.5	63.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.3	3.8	1.8	50	82.3	73.3	110.6	50.0	49.9	53.9
Total	0.6	6.8								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	250		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.2	151	68.0	75.1
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-1.2	50	50.0	72.0
Total	-2.4			

Room Checksums

By HDR

116 SR TRAFFIC OFFICE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 9 / 11
Outside Air: OADB/WB/HR: 79 / 64 / 69

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	695	0	695	18
Glass/Door Cond	12	0	12	0
Wall Cond	1,332	423	1,756	45
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	3.32	3.32	0.09
Infiltration	0		0	0
Sub Total ==>	2,040	427	2,466	64
Internal Loads				
Lights	220	220	441	11
People	450	0	450	12
Misc	476	0	476	12
Sub Total ==>	1,147	220	1,367	35
Ceiling Load	575	-575	0	0
Ventilation Load	-16	0	-16	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			50	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	3,746	72	3,867	100.00

CLG SPACE PEAK

Mo/Hr: 10 / 12
OADB: 70

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	699	20
Glass/Door Cond	-36	-1
Wall Cond	1,465	42
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	2,128	61
Internal Loads		
Lights	222	6
People	223	6
Misc	481	14
Sub Total ==>	927	26
Ceiling Load	561	16
Ventilation Load	-110	-3
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	3,506	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-212	-212	4.31
Wall Cond	-614	-751	15.26
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-44.35	0.90
Infiltration	0	0	0.00
Sub Total ==>	-826	-1,007	20.48
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-893	0	0.00
Ventilation Load	110	110	-2.25
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-2,337	-2,337	47.52
Exhaust Heat		0	0.00
OA Preheat Diff.		-928	18.87
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-757	15.38
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-3,945	-4,918	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	89.4
Ra Plenum	84.5	51.7
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	167	167
Terminal	167	167
Main Fan	167	167
Sec Fan	0	0
Nom Vent	50	50
AHU Vent	50	50
Infil	0	0
MinStop/Rh	17	17
Return	217	217
Exhaust	50	50
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	29.9	29.9
cfm/ft²	0.97	0.97
cfm/ton	261.93	
ft²/ton	271.26	
Btu/hr·ft²	44.24	-29.83
No. People	1.0	5.8/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.3	3.9	3.6	167	74.3	61.8	63.4	55.0	53.8	60.6
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.3	3.8	1.8	50	82.3	73.3	110.6	50.0	49.9	53.9
Total	0.6	7.7								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	173		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	231	12	5
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-4.0	167	68.0	89.4
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-1.2	50	50.0	72.0
Total	-5.2			

Room Checksums

By HDR

117 SR TRAFFIC OFFICE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 11
Outside Air: OADB/WB/HR: 88 / 72 / 97

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	847	0	847	16
Glass/Door Cond	116	0	116	2
Wall Cond	2,108	692	2,800	54
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-13.76	-13.76	-0.26
Infiltration	0		0	0
Sub Total ==>	3,071	679	3,750	72
Internal Loads				
Lights	248	248	497	10
People	450	0	450	9
Misc	476	0	476	9
Sub Total ==>	1,175	248	1,423	27
Ceiling Load	696	-696	0	0
Ventilation Load	-13	0	-13	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			65	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	4,929	231	5,225	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 11
OADB: 88

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	847	18
Glass/Door Cond	116	3
Wall Cond	2,108	46
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	3,071	66
Internal Loads		
Lights	248	5
People	250	5
Misc	476	10
Sub Total ==>	975	21
Ceiling Load	696	15
Ventilation Load	-110	-2
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	4,631	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-424	-424	6.53
Wall Cond	-869	-1,067	16.44
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-349.00	5.38
Infiltration	0	0	0.00
Sub Total ==>	-1,293	-1,840	28.35
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,006	0	0.00
Ventilation Load	110	110	-1.70
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-3,024	-3,024	46.60
Exhaust Heat		0	0.00
OA Preheat Diff.		-928	14.30
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-808	12.45
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-5,213	-6,489	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	89.4
Ra Plenum	85.3	51.7
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	221	221
Terminal	221	221
Main Fan	221	221
Sec Fan	0	0
Nom Vent	50	50
AHU Vent	50	50
Infil	0	0
MinStop/Rh	22	22
Return	271	271
Exhaust	50	50
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	22.7	22.7
cfm/ft²	1.13	1.13
cfm/ton	293.91	
ft²/ton	259.69	
Btu/hr·ft²	46.21	-32.96
No. People	1.0	5.1/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.4	5.2	4.9	221	74.3	61.8	63.4	55.0	53.7	59.9
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.3	3.8	1.8	50	82.3	73.3	110.6	50.0	49.9	53.9
Total	0.8	9.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	195		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	336	24	7
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-5.2	221	68.0	89.4
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-1.2	50	50.0	72.0
Total	-6.4			

Room Checksums

By HDR

118 FILE ROOM

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 6 / 11
Outside Air: OADB/WB/HR: 86 / 69 / 83

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	711	220	931	100
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-6.30	-6.30	-0.68
Infiltration	0		0	0
Sub Total ==>	711	214	925	99
Internal Loads				
Lights	115	115	229	25
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	115	115	229	25
Ceiling Load	207	-207	0	0
Ventilation Load	-233	0	-233	-25
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			8	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	800	121	930	100.00

CLG SPACE PEAK

Mo/Hr: 6 / 11
OADB: 86

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	711	101
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	711	101
Internal Loads		
Lights	115	16
People	0	0
Misc	0	0
Sub Total ==>	115	16
Ceiling Load	207	30
Ventilation Load	-331	-47
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	702	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-298	-360	20.67
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-161.08	9.25
Infiltration	0	0	0.00
Sub Total ==>	-298	-521	29.92
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-464	0	0.00
Ventilation Load	110	110	-6.34
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-928	53.29
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-403	23.14
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-652	-1,741	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	89.4
Ra Plenum	85.3	51.7
Return	78.0	68.0
Ret/OA	78.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	28	28
Terminal	28	28
Main Fan	28	28
Sec Fan	0	0
Nom Vent	50	50
AHU Vent	50	50
Infil	0	0
MinStop/Rh	3	3
Return	78	78
Exhaust	50	50
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	181.1	181.1
cfm/ft²	0.31	0.31
cfm/ton	68.21	
ft²/ton	222.30	
Btu/hr·ft²	53.98	-20.75
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.1	0.9	0.8	28	78.3	65.1	72.5	55.0	54.0	61.2
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.3	3.9	1.9	50	84.9	74.0	110.6	50.0	49.9	53.9
Total	0.4	4.9								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	90		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	104	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.7	28	68.0	89.4
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-1.2	50	50.0	72.0
Total	-1.9			

Room Checksums

By HDR

119 COMM

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 6 / 11
Outside Air: OADB/WB/HR: 86 / 69 / 83

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	892	266	1,158	15
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-7.70	-7.70	-0.10
Infiltration	0		0	0
Sub Total ==>	892	258	1,150	15
Internal Loads				
Lights	140	140	280	4
People	0	0	0	0
Misc	6,000	0	6,000	80
Sub Total ==>	6,140	140	6,280	83
Ceiling Load	393	-393	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			105	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	7,425	6	7,535	100.00

CLG SPACE PEAK

Mo/Hr: 6 / 11
OADB: 86

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	892	12
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	892	12
Internal Loads		
Lights	140	2
People	0	0
Misc	6,000	81
Sub Total ==>	6,140	83
Ceiling Load	393	5
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	7,425	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-360	-434	38.62
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-196.87	17.51
Infiltration	0	0	0.00
Sub Total ==>	-360	-631	56.13
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-568	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-493	43.87
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-928	-1,125	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	70.4
Ra Plenum	85.3	51.7
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	354	354
Terminal	354	354
Main Fan	354	354
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	35	35
Return	354	354
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	3.22	3.22
cfm/ton	563.44	
ft²/ton	175.18	
Btu/hr·ft²	68.50	-8.43
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	0.6	7.5	7.5	354	74.3	61.8	63.4	55.0	54.5	63.3
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.6	7.5								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	110		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	126	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.9	354	68.0	70.4
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-0.9			

Room Checksums

By HDR

120 MECH/ELEC ROOM

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 17
Outside Air: OADB/WB/HR: 94 / 75 / 105

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	365	365	12
Glass Solar	0	0	0	0
Glass/Door Cond	115	0	115	4
Wall Cond	1,537	8	1,545	50
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	552		552	18
Sub Total ==>	2,204	373	2,577	84
Internal Loads				
Lights	459	0	459	15
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	459	0	459	15
Ceiling Load	326	-326	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			46	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
***Grand Total* ==>**	2,989	47	3,082	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 12
OADB: 91

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	70	3
Wall Cond	1,661	61
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	194	7
Sub Total ==>	1,925	71
Internal Loads		
Lights	463	17
People	0	0
Misc	0	0
Sub Total ==>	463	17
Ceiling Load	328	12
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
***Grand Total* ==>**	2,716	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-129	7.48
Glass Solar	0	0	0.00
Glass/Door Cond	-228	-228	13.24
Wall Cond	-783	-787	45.69
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	0.00	0.00
Infiltration	-524	-524	30.43
Sub Total ==>	-1,535	-1,668	96.84
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-187	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-54	3.16
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
***Grand Total* ==>**	-1,723	-1,723	100.00

TEMPERATURES

	Cooling	Heating
SADB	64.1	65.1
Ra Plenum	85.7	51.7
Return	80.0	55.0
Ret/OA	80.0	55.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	155	155
Terminal	155	155
Main Fan	155	155
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	16	16
MinStop/Rh	15	15
Return	170	170
Exhaust	16	16
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.86	0.86
cfm/ton	601.84	
ft²/ton	700.91	
Btu/hr·ft²	17.12	-9.57
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.3	3.1	2.8	155	80.3	66.7	77.5	64.1	60.7	74.6
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.3	3.1								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	180		
Part	0		
Int Door	0		
ExFlr	0		
Roof	180	0	0
Wall	297	0	0
Ext Door	21	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.7	155	55.0	65.1
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-1.7			

Room Checksums

By HDR

ATTIC

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 16
Outside Air: OADB/WB/HR: 95 / 76 / 107

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	9,998	9,998	53
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	7,601	100	7,701	41
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	1,204.05	0.00	1,204.05	6.37
Infiltration	0		0	0
Sub Total ==>	8,805	10,098	18,902	100
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	1,411	-1,411	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	10,215	8,687	18,902	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	8,820	81
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	985.03	9.06
Infiltration	0	0
Sub Total ==>	9,805	90
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load	1,072	10
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	10,878	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-4,037	-25.19
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-2,510	-2,553	-15.92
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	8,521.95	8,521.95	53.16
Infiltration	0	0	0.00
Sub Total ==>	6,012	1,932	12.05
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	10,019	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		14,099	87.95
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	16,031	16,031	100.00

TEMPERATURES

	Cooling	Heating
SADB	85.0	45.0
Ra Plenum	86.0	51.7
Return	86.0	51.7
Ret/OA	86.0	51.7
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	0
Terminal	0	0
Main Fan	0	0
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	0	0
Return	0	0
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.00	0.00
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	0.00
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	4,710		
Part	0		
Int Door	0		
ExFlr	4,723		
Roof	4,745	0	0
Wall	1,152	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	0.0	0	0.0	0.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	0.0			

Room Checksums

By HDR

HALLWAY

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 11
Outside Air: OADB/WB/HR: 88 / 72 / 97

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	499	0	499	7
Glass/Door Cond	257	0	257	4
Wall Cond	2,437	822	3,259	48
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-43.39	-43.39	-0.64
Infiltration	1,235		1,235	18
Sub Total ==>	4,427	779	5,206	77
Internal Loads				
Lights	787	787	1,574	23
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	787	787	1,574	23
Ceiling Load	2,195	-2,195	0	0
Ventilation Load	-132	0	-132	-2
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			91	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	7,277	-629	6,739	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 11
OADB: 88

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	499	8
Glass/Door Cond	257	4
Wall Cond	2,437	38
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	413	6
Sub Total ==>	3,605	56
Internal Loads		
Lights	787	12
People	0	0
Misc	0	0
Sub Total ==>	787	12
Ceiling Load	2,195	34
Ventilation Load	-110	-2
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	6,476	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-860	-860	9.03
Wall Cond	-1,212	-1,504	15.79
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-1,100.70	11.55
Infiltration	-1,308	-1,308	13.73
Sub Total ==>	-3,381	-4,773	50.10
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-3,174	0	0.00
Ventilation Load	110	110	-1.16
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-1,055	-1,055	11.07
Exhaust Heat		0	0.00
OA Preheat Diff.		-928	9.74
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-2,882	30.25
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-7,499	-9,528	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	90.0
Ra Plenum	85.3	51.7
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	309	309
Terminal	309	309
Main Fan	309	309
Sec Fan	0	0
Nom Vent	50	50
AHU Vent	50	50
Infil	28	28
MinStop/Rh	31	31
Return	386	386
Exhaust	78	78
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	16.2	16.2
cfm/ft²	0.50	0.50
cfm/ton	351.86	
ft²/ton	701.18	
Btu/hr·ft²	17.11	-14.17
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.6	6.7	5.9	309	74.3	61.8	63.4	55.0	54.3	62.5
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.3	3.8	1.8	50	82.3	73.3	110.6	50.0	49.9	53.9
Total	0.9	10.5								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	615		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	462	20	4
Ext Door	33	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-7.5	309	68.0	90.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	-1.2	50	50.0	72.0
Total	-8.7			

Room Checksums

By HDR

100 VESTIBULE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 0 / 0
Outside Air: OADB/WB/HR: 0 / 0 / 0

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	0		0	0
Sub Total ==>	0	0	0	0
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	0	0	0	100.00

CLG SPACE PEAK

Mo/Hr: 0 / 0
OADB: 0

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load	0	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	0	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-80	3.93
Glass Solar	0	0	0.00
Glass/Door Cond	-751	-751	37.06
Wall Cond	-766	-1,000	49.36
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	0.00	0.00
Infiltration	-196	-196	9.66
Sub Total ==>	-1,713	-2,027	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-314	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-2,027	-2,027	100.00

TEMPERATURES

	Cooling	Heating
SADB	0.0	125.0
Ra Plenum	0.0	57.2
Return	0.0	68.0
Ret/OA	0.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	32
Terminal	0	32
Main Fan	0	32
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	4
MinStop/Rh	0	0
Return	0	36
Exhaust	0	4
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.00	0.35
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	-22.03
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	92		
Part	0		
Int Door	0		
ExFlr	0		
Roof	92	0	0
Wall	303	20	7
Ext Door	26	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.0	32	68.0	125.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.0			

Room Checksums

By HDR

101 LOBBY

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 17
Outside Air: OADB/WB/HR: 94 / 75 / 105

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	1,493	0	1,493	6
Glass/Door Cond	312	0	312	1
Wall Cond	3,204	1,071	4,275	16
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-175.10	-175.10	-0.67
Infiltration	1,944		1,944	7
Sub Total ==>	6,954	896	7,849	30
Internal Loads				
Lights	1,101	1,101	2,201	8
People	5,400	0	5,400	21
Misc	1,596	0	1,596	6
Sub Total ==>	8,096	1,101	9,197	35
Ceiling Load	3,206	-3,206	0	0
Ventilation Load	0	0	7,056	27
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			2,037	8
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	18,255	-1,209	26,140	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	1,493	8
Glass/Door Cond	312	2
Wall Cond	3,204	17
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	846	4
Sub Total ==>	5,856	31
Internal Loads		
Lights	1,101	6
People	3,000	16
Misc	1,596	8
Sub Total ==>	5,696	30
Ceiling Load	3,206	17
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	4,275	22
Exhaust Heat		
Sup. Fan Heat		
Ret. Fan Heat		
Duct Heat Pkup		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	19,032	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-636	-636	3.39
Wall Cond	-1,183	-1,456	7.76
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-1,543.90	8.24
Infiltration	-1,829	-1,829	9.76
Sub Total ==>	-3,648	-5,465	29.15
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-4,432	0	0.00
Ventilation Load	0	-6,255	33.37
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-279	1.49
RA Preheat Diff.		-2,585	13.79
Additional Reheat		0	0.00
System Plenum Heat		-4,160	22.19
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-8,081	-18,745	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.5	90.0
Ra Plenum	85.8	51.7
Return	74.0	68.0
Ret/OA	77.2	51.0
Fn MtrTD	0.2	0.0
Fn BldTD	0.5	0.0
Fn Frict	1.5	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	1,109	333
Terminal	1,109	333
Main Fan	1,109	333
Sec Fan	0	0
Nom Vent	140	132
AHU Vent	140	132
Infil	39	39
MinStop/Rh	333	333
Return	1,147	371
Exhaust	179	171
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	12.7	39.8
cfm/ft²	1.29	0.39
cfm/ton	508.88	
ft²/ton	394.80	
Btu/hr·ft²	30.40	-20.00
No. People	12.0	14.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	2.2	26.1	18.7	860	77.2	64.4	70.8	56.3	54.3	60.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	2.2	26.1								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	860		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	462	36	8
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-12.4	333	56.3	90.0
Aux Htg	0.0	0	0.0	0.0
Preheat	-4.8	140	25.2	56.3
Reheat	-4.3	333	56.3	68.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-17.2			

Room Checksums

By HDR

102 WOMENS RR

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 19
Outside Air: OADB/WB/HR: 89 / 73 / 97

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	820	250	1,070	59
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	12.57	12.57	0.69
Infiltration	0		0	0
Sub Total ==>	820	263	1,083	59
Internal Loads				
Lights	72	72	145	8
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	72	72	145	8
Ceiling Load	229	-229	0	0
Ventilation Load	0	0	444	24
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			155	8
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	1,122	106	1,826	100.00

CLG SPACE PEAK

Mo/Hr: 6 / 19
OADB: 87

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	848	55
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	848	55
Internal Loads		
Lights	72	5
People	0	0
Misc	0	0
Sub Total ==>	72	5
Ceiling Load	227	15
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Exhaust Heat	388	25
Grand Total ==>	1,536	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-291	-352	23.23
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-125.67	8.30
Infiltration	0	0	0.00
Sub Total ==>	-291	-477	31.53
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-361	0	0.00
Ventilation Load	0	-505	33.35
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-23	1.49
RA Preheat Diff.		-209	13.78
Additional Reheat		0	0.00
System Plenum Heat		-301	19.85
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-652	-1,514	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.5	90.0
Ra Plenum	84.3	51.7
Return	74.0	68.0
Ret/OA	76.5	51.0
Fn MtrTD	0.2	0.0
Fn BldTD	0.5	0.0
Fn Frict	1.5	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	89	27
Terminal	89	27
Main Fan	89	27
Sec Fan	0	0
Nom Vent	11	11
AHU Vent	11	11
Infil	0	0
MinStop/Rh	27	27
Return	89	27
Exhaust	11	11
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	12.7	39.8
cfm/ft²	1.28	0.38
cfm/ton	587.81	
ft²/ton	459.93	
Btu/hr·ft²	26.09	-19.83
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.2	1.8	1.6	65	76.5	64.0	69.9	56.3	54.7	61.9
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.2	1.8								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	70		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	102	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.0	27	56.3	90.0
Aux Htg	0.0	0	0.0	0.0
Preheat	-0.4	11	25.2	56.3
Reheat	-0.4	27	56.3	68.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-1.4			

Room Checksums

By HDR

103 MENS RR

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 96 / 77 / 111

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-19.08	-19.08	-3.74
Infiltration	0		0	0
Sub Total ==>	0	-19	-19	-4
Internal Loads				
Lights	78	78	155	30
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	78	78	155	30
Ceiling Load	249	-249	0	0
Ventilation Load	0	0	329	64
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			45	9
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	327	-191	511	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 12
OADB: 91

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	84	11
People	0	0
Misc	0	0
Sub Total ==>	84	11
Ceiling Load	243	31
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	462	58
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	789	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-116.69	14.06
Infiltration	0	0	0.00
Sub Total ==>	0	-117	14.06
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-335	0	0.00
Ventilation Load	0	-259	31.26
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-12	1.39
RA Preheat Diff.		-107	12.92
Additional Reheat		0	0.00
System Plenum Heat		-335	40.37
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-335	-830	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.5	90.0
Ra Plenum	86.1	51.7
Return	74.0	68.0
Ret/OA	80.7	51.0
Fn MtrTD	0.2	0.0
Fn BldTD	0.5	0.0
Fn Frict	1.5	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	46	14
Terminal	46	14
Main Fan	46	14
Sec Fan	0	0
Nom Vent	6	5
AHU Vent	6	5
Infil	0	0
MinStop/Rh	14	14
Return	46	14
Exhaust	6	5
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	12.7	39.8
cfm/ft²	0.71	0.21
cfm/ton	1,079.84	
ft²/ton	1,527.23	
Btu/hr·ft²	7.86	-10.97
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.5	0.3	19	80.7	67.0	78.4	56.3	56.3	68.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.5								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	65		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.5	14	56.3	90.0
Aux Htg	0.0	0	0.0	0.0
Preheat	-0.2	6	25.2	56.3
Reheat	-0.2	14	56.3	68.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-0.7			

Room Checksums

By HDR

104 WOMENS RR

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 19
Outside Air: OADB/WB/HR: 89 / 73 / 97

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	840	256	1,096	59
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	12.21	12.21	0.66
Infiltration	0		0	0
Sub Total ==>	840	268	1,108	60
Internal Loads				
Lights	70	70	141	8
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	70	70	141	8
Ceiling Load	223	-223	0	0
Ventilation Load	0	0	441	24
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			156	8
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	1,133	116	1,846	100.00

CLG SPACE PEAK

Mo/Hr: 6 / 19
OADB: 87

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	868	57
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	868	57
Internal Loads		
Lights	70	5
People	0	0
Misc	0	0
Sub Total ==>	70	5
Ceiling Load	221	14
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Dehumid. Ov Sizing		
Ov/Undr Sizing	369	24
Exhaust Heat		
Sup. Fan Heat		
Ret. Fan Heat		
Duct Heat Pkup		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	1,528	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-298	-360	23.95
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-122.08	8.12
Infiltration	0	0	0.00
Sub Total ==>	-298	-482	32.07
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-350	0	0.00
Ventilation Load	0	-502	33.41
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-22	1.49
RA Preheat Diff.		-208	13.81
Additional Reheat		0	0.00
System Plenum Heat		-289	19.22
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-649	-1,503	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.5	90.0
Ra Plenum	84.3	51.7
Return	74.0	68.0
Ret/OA	76.5	51.0
Fn MtrTD	0.2	0.0
Fn BldTD	0.5	0.0
Fn Frict	1.5	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	89	27
Terminal	89	27
Main Fan	89	27
Sec Fan	0	0
Nom Vent	11	11
AHU Vent	11	11
Infil	0	0
MinStop/Rh	27	27
Return	89	27
Exhaust	11	11
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	12.7	39.8
cfm/ft²	1.31	0.39
cfm/ton	578.43	
ft²/ton	442.00	
Btu/hr·ft²	27.15	-20.31
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.2	1.9	1.6	66	76.5	63.9	69.8	56.3	54.6	61.7
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.2	1.9								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	68		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	104	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.0	27	56.3	90.0
Aux Htg	0.0	0	0.0	0.0
Preheat	-0.4	11	25.2	56.3
Reheat	-0.3	27	56.3	68.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-1.4			

Room Checksums

By HDR

105 MENS RR

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 96 / 77 / 111

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-2.61	-2.61	-0.52
Infiltration	0		0	0
Sub Total ==>	0	-3	-3	-1
Internal Loads				
Lights	74	74	148	29
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	74	74	148	29
Ceiling Load	238	-238	0	0
Ventilation Load	0	0	314	62
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			43	9
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	312	-166	503	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 12
OADB: 91

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	80	11
People	0	0
Misc	0	0
Sub Total ==>	80	11
Ceiling Load	232	31
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	440	58
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	753	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-15.94	2.29
Infiltration	0	0	0.00
Sub Total ==>	0	-16	2.29
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-320	0	0.00
Ventilation Load	0	-247	35.54
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-11	1.58
RA Preheat Diff.		-102	14.69
Additional Reheat		0	0.00
System Plenum Heat		-320	45.90
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-320	-696	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.5	90.0
Ra Plenum	86.1	51.7
Return	74.0	68.0
Ret/OA	80.7	51.0
Fn MtrTD	0.2	0.0
Fn BldTD	0.5	0.0
Fn Frict	1.5	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	44	13
Terminal	44	13
Main Fan	44	13
Sec Fan	0	0
Nom Vent	6	5
AHU Vent	6	5
Infil	0	0
MinStop/Rh	13	13
Return	44	13
Exhaust	6	5
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	12.7	39.8
cfm/ft²	0.71	0.21
cfm/ton	1,046.35	
ft²/ton	1,479.86	
Btu/hr·ft²	8.11	-10.97
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.5	0.3	18	80.7	67.0	78.4	56.3	56.3	68.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.5								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	62		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.5	13	56.3	90.0
Aux Htg	0.0	0	0.0	0.0
Preheat	-0.2	6	25.2	56.3
Reheat	-0.2	13	56.3	68.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-0.7			

Room Checksums

By HDR

106 VCC OFFICE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 96 / 77 / 111

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-17.45	-17.45	-0.29
Infiltration	0		0	0
Sub Total ==>	0	-17	-17	0
Internal Loads				
Lights	496	496	991	17
People	865	0	865	14
Misc	1,485	0	1,485	25
Sub Total ==>	2,845	496	3,341	56
Ceiling Load	1,591	-1,591	0	0
Ventilation Load	0	0	2,103	35
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			557	9
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	4,437	-1,113	5,984	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	531	11
People	500	10
Misc	1,596	32
Sub Total ==>	2,627	52
Ceiling Load	1,547	31
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	864	17
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	5,038	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-106.72	2.29
Infiltration	0	0	0.00
Sub Total ==>	0	-107	2.29
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-2,139	0	0.00
Ventilation Load	0	-1,656	35.53
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-74	1.59
RA Preheat Diff.		-684	14.69
Additional Reheat		0	0.00
System Plenum Heat		-2,139	45.90
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-2,139	-4,660	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.5	90.0
Ra Plenum	86.1	51.7
Return	74.0	68.0
Ret/OA	77.5	51.0
Fn MtrTD	0.2	0.0
Fn BldTD	0.5	0.0
Fn Frict	1.5	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	293	88
Terminal	293	88
Main Fan	293	88
Sec Fan	0	0
Nom Vent	37	35
AHU Vent	37	35
Infil	0	0
MinStop/Rh	88	88
Return	293	88
Exhaust	37	35
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	12.7	39.8
cfm/ft²	0.71	0.21
cfm/ton	588.43	
ft²/ton	832.26	
Btu/hr·ft²	14.42	-10.97
No. People	2.0	4.8/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.5	6.0	4.4	235	77.5	64.6	71.5	56.3	56.3	68.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.5	6.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	415		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-3.3	88	56.3	90.0
Aux Htg	0.0	0	0.0	0.0
Preheat	-1.3	37	25.2	56.3
Reheat	-1.1	88	56.3	68.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-4.6			

Room Checksums

By HDR

107 JANITORS

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 96 / 77 / 111

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-19.08	-19.08	-3.74
Infiltration	0		0	0
Sub Total ==>	0	-19	-19	-4
Internal Loads				
Lights	78	78	155	30
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	78	78	155	30
Ceiling Load	249	-249	0	0
Ventilation Load	0	0	329	64
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			45	9
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	327	-191	511	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 12
OADB: 91

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	84	11
People	0	0
Misc	0	0
Sub Total ==>	84	11
Ceiling Load	243	31
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	462	58
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	789	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-116.69	14.06
Infiltration	0	0	0.00
Sub Total ==>	0	-117	14.06
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-335	0	0.00
Ventilation Load	0	-259	31.26
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-12	1.39
RA Preheat Diff.		-107	12.92
Additional Reheat		0	0.00
System Plenum Heat		-335	40.37
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-335	-830	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.5	90.0
Ra Plenum	86.1	51.7
Return	74.0	68.0
Ret/OA	80.7	51.0
Fn MtrTD	0.2	0.0
Fn BldTD	0.5	0.0
Fn Frict	1.5	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	46	14
Terminal	46	14
Main Fan	46	14
Sec Fan	0	0
Nom Vent	6	5
AHU Vent	6	5
Infil	0	0
MinStop/Rh	14	14
Return	46	14
Exhaust	6	5
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	12.7	39.8
cfm/ft²	0.71	0.21
cfm/ton	1,079.84	
ft²/ton	1,527.23	
Btu/hr·ft²	7.86	-10.97
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.5	0.3	19	80.7	67.0	78.4	56.3	56.3	68.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.5								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	65		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.5	14	56.3	90.0
Aux Htg	0.0	0	0.0	0.0
Preheat	-0.2	6	25.2	56.3
Reheat	-0.2	14	56.3	68.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-0.7			

Room Checksums

By HDR

108 STORAGE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 21
Outside Air: OADB/WB/HR: 83 / 71 / 98

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	58.27	58.27	13.52
Infiltration	0		0	0
Sub Total ==>	0	58	58	14
Internal Loads				
Lights	52	52	104	24
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	52	52	104	24
Ceiling Load	119	-119	0	0
Ventilation Load	0	0	79	18
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	139		139	32
Exhaust Heat		0	0	0
Sup. Fan Heat			50	12
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	310	-9	431	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 12
OADB: 91

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	110	24
People	0	0
Misc	0	0
Sub Total ==>	110	24
Ceiling Load	210	46
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	138	30
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	459	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-152.59	13.20
Infiltration	0	0	0.00
Sub Total ==>	0	-153	13.20
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-438	0	0.00
Ventilation Load	0	-400	34.59
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		-165	14.30
Additional Reheat		0	0.00
System Plenum Heat		-438	37.91
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-438	-1,156	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.5	86.7
Ra Plenum	82.4	51.7
Return	78.0	68.0
Ret/OA	78.7	51.0
Fn MtrTD	0.2	0.0
Fn BldTD	0.5	0.0
Fn Frict	1.5	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	21	21
Terminal	21	21
Main Fan	21	21
Sec Fan	0	0
Nom Vent	3	8
AHU Vent	3	8
Infil	0	0
MinStop/Rh	21	21
Return	21	21
Exhaust	3	8
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	12.7	39.8
cfm/ft²	0.25	0.25
cfm/ton	591.58	
ft²/ton	2,366.31	
Btu/hr·ft²	5.07	-11.80
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.4	0.4	21	78.7	64.4	68.4	56.3	56.3	68.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.4								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	85		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.7	21	56.3	86.7
Aux Htg	0.0	0	0.0	0.0
Preheat	-0.3	8	25.2	56.3
Reheat	-0.3	21	56.3	68.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-1.0			

Room Checksums

By HDR

109 VESTIBULE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 0 / 0
Outside Air: OADB/WB/HR: 0 / 0 / 0

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	0		0	0
Sub Total ==>	0	0	0	0
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	0	0	0	100.00

CLG SPACE PEAK

Mo/Hr: 0 / 0
OADB: 0

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load	0	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	0	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-751	-751	28.50
Wall Cond	-598	-779	29.55
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-548.99	20.83
Infiltration	-255	-255	9.69
Sub Total ==>	-1,604	-2,334	88.56
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-482	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-301	11.44
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-2,087	-2,636	100.00

TEMPERATURES

	Cooling	Heating
SADB	0.0	125.0
Ra Plenum	0.0	55.3
Return	0.0	68.0
Ret/OA	0.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	33
Terminal	0	33
Main Fan	0	33
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	5
MinStop/Rh	0	0
Return	0	39
Exhaust	0	5
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.00	0.28
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	-17.39
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	120		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	245	20	8
Ext Door	26	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.1	33	68.0	125.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.1			

Room Checksums

By HDR

110 MMT CARRIER

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 17
Outside Air: OADB/WB/HR: 94 / 75 / 105

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	1,773	534	2,307	33
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-46.83	-46.83	-0.66
Infiltration	0		0	0
Sub Total ==>	1,773	487	2,260	32
Internal Loads				
Lights	293	293	586	8
People	900	0	900	13
Misc	952	0	952	13
Sub Total ==>	2,145	293	2,438	35
Ceiling Load	857	-857	0	0
Ventilation Load	0	0	1,761	25
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			604	9
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	4,776	-77	7,064	100.00

CLG SPACE PEAK

Mo/Hr: 9 / 17
OADB: 85

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	2,208	46
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	2,208	46
Internal Loads		
Lights	293	6
People	500	11
Misc	952	20
Sub Total ==>	1,745	37
Ceiling Load	797	17
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	4,751	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-627	-757	16.81
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-412.90	9.17
Infiltration	0	0	0.00
Sub Total ==>	-627	-1,170	25.99
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,185	0	0.00
Ventilation Load	0	-1,561	34.68
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-70	1.55
RA Preheat Diff.		-645	14.33
Additional Reheat		0	0.00
System Plenum Heat		-1,056	23.45
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,813	-4,502	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.5	87.8
Ra Plenum	85.8	51.7
Return	74.0	68.0
Ret/OA	76.7	51.0
Fn MtrTD	0.2	0.0
Fn BldTD	0.5	0.0
Fn Frict	1.5	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	277	83
Terminal	277	83
Main Fan	277	83
Sec Fan	0	0
Nom Vent	35	33
AHU Vent	35	33
Infil	0	0
MinStop/Rh	83	83
Return	277	83
Exhaust	35	33
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	12.7	39.8
cfm/ft²	1.20	0.36
cfm/ton	470.06	
ft²/ton	390.73	
Btu/hr·ft²	30.71	-17.78
No. People	2.0	8.7/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.6	7.1	5.7	255	76.7	64.0	69.8	56.3	54.8	62.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.6	7.1								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	230		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	220	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.9	83	56.3	87.8
Aux Htg	0.0	0	0.0	0.0
Preheat	-1.2	35	25.2	56.3
Reheat	-1.1	83	56.3	68.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-4.1			

Room Checksums

By HDR

111 TRAF CHECK IN

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 96 / 77 / 111

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-46.97	-46.97	-2.11
Infiltration	0		0	0
Sub Total ==>	0	-47	-47	-2
Internal Loads				
Lights	191	191	382	17
People	433	0	433	19
Misc	445	0	445	20
Sub Total ==>	1,069	191	1,260	57
Ceiling Load	613	-613	0	0
Ventilation Load	0	0	811	36
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			205	9
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	1,683	-469	2,229	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	205	11
People	250	13
Misc	479	25
Sub Total ==>	933	48
Ceiling Load	596	31
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	412	21
Grand Total ==>	1,942	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-287.24	14.06
Infiltration	0	0	0.00
Sub Total ==>	0	-287	14.06
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-825	0	0.00
Ventilation Load	0	-638	31.25
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-28	1.39
RA Preheat Diff.		-264	12.92
Additional Reheat		0	0.00
System Plenum Heat		-825	40.37
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-825	-2,043	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.5	90.0
Ra Plenum	86.1	51.7
Return	74.0	68.0
Ret/OA	77.7	51.0
Fn MtrTD	0.2	0.0
Fn BldTD	0.5	0.0
Fn Frict	1.5	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	113	34
Terminal	113	34
Main Fan	113	34
Sec Fan	0	0
Nom Vent	14	14
AHU Vent	14	14
Infil	0	0
MinStop/Rh	34	34
Return	113	34
Exhaust	14	14
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	12.7	39.8
cfm/ft²	0.71	0.21
cfm/ton	609.14	
ft²/ton	861.53	
Btu/hr·ft²	13.93	-10.97
No. People	1.0	6.3/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.2	2.2	1.6	86	77.7	64.7	71.9	56.3	56.3	68.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.2	2.2								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	160		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.3	34	56.3	90.0
Aux Htg	0.0	0	0.0	0.0
Preheat	-0.5	14	25.2	56.3
Reheat	-0.4	34	56.3	68.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-1.8			

Room Checksums

By HDR

112 OPEN OFFICE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 12
Outside Air: OADB/WB/HR: 91 / 75 / 104

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	1,278	0	1,278	6
Glass/Door Cond	228	0	228	1
Wall Cond	4,131	1,273	5,404	24
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-159.31	-159.31	-0.71
Infiltration	0		0	0
Sub Total ==>	5,638	1,114	6,751	30
Internal Loads				
Lights	951	951	1,903	8
People	2,300	0	2,300	10
Misc	4,171	0	4,171	19
Sub Total ==>	7,422	951	8,373	37
Ceiling Load	2,769	-2,769	0	0
Ventilation Load	0	0	5,335	24
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			2,053	9
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	15,828	-703	22,512	100.00

CLG SPACE PEAK

Mo/Hr: 9 / 12
OADB: 82

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	1,897	12
Glass/Door Cond	90	1
Wall Cond	4,588	29
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	6,575	42
Internal Loads		
Lights	951	6
People	1,340	9
Misc	4,171	27
Sub Total ==>	6,462	41
Ceiling Load	2,616	17
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	15,653	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-636	-636	4.16
Wall Cond	-2,014	-2,459	16.08
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-1,328.47	8.69
Infiltration	0	0	0.00
Sub Total ==>	-2,650	-4,423	28.92
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-3,814	0	0.00
Ventilation Load	0	-5,145	33.64
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-230	1.50
RA Preheat Diff.		-2,126	13.90
Additional Reheat		0	0.00
System Plenum Heat		-3,369	22.03
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-6,464	-15,293	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.5	89.4
Ra Plenum	85.8	51.7
Return	74.0	68.0
Ret/OA	76.3	51.0
Fn MtrTD	0.2	0.0
Fn BldTD	0.5	0.0
Fn Frict	1.5	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	912	274
Terminal	912	274
Main Fan	912	274
Sec Fan	0	0
Nom Vent	116	109
AHU Vent	116	109
Infil	0	0
MinStop/Rh	274	274
Return	912	274
Exhaust	116	109
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	12.7	39.8
cfm/ft²	1.23	0.37
cfm/ton	485.97	
ft²/ton	394.46	
Btu/hr·ft²	30.42	-18.87
No. People	6.0	8.1/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	1.9	22.5	18.4	866	76.3	63.8	69.4	56.3	55.2	63.8
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	1.9	22.5								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	740		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	753	36	5
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-10.0	274	56.3	89.4
Aux Htg	0.0	0	0.0	0.0
Preheat	-4.0	116	25.2	56.3
Reheat	-3.5	274	56.3	68.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-14.0			

Room Checksums

By HDR

113 CONFERENCE/TRAINING

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 16
Outside Air: OADB/WB/HR: 95 / 76 / 107

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-92.98	-92.98	-0.82
Infiltration	0		0	0
Sub Total ==>	0	-93	-93	-1
Internal Loads				
Lights	430	430	860	8
People	6,300	0	6,300	55
Misc	983	0	983	9
Sub Total ==>	7,713	430	8,143	72
Ceiling Load	1,330	-1,330	0	0
Ventilation Load	0	0	2,471	22
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			862	8
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	9,043	-993	11,383	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	448	7
People	3,500	56
Misc	1,021	16
Sub Total ==>	4,969	79
Ceiling Load	1,305	21
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	6,274	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-628.33	8.41
Infiltration	0	0	0.00
Sub Total ==>	0	-628	8.41
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,804	0	0.00
Ventilation Load	0	-3,566	47.72
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		-1,474	19.73
Additional Reheat		0	0.00
System Plenum Heat		-1,804	24.14
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,804	-7,472	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.5	76.6
Ra Plenum	86.0	51.7
Return	74.0	68.0
Ret/OA	76.7	51.0
Fn MtrTD	0.2	0.0
Fn BldTD	0.5	0.0
Fn Frict	1.5	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	365	190
Terminal	365	190
Main Fan	365	190
Sec Fan	0	0
Nom Vent	46	75
AHU Vent	46	75
Infil	0	0
MinStop/Rh	190	190
Return	365	190
Exhaust	46	75
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	12.7	39.8
cfm/ft²	1.04	0.54
cfm/ton	385.22	
ft²/ton	368.98	
Btu/hr·ft²	32.52	-19.55
No. People	14.0	40.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	1.0	11.4	7.2	364	76.7	64.0	69.6	56.3	53.5	57.1
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	1.0	11.4								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	350		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-4.3	190	56.3	76.6
Aux Htg	0.0	0	0.0	0.0
Preheat	-2.6	75	25.2	56.3
Reheat	-2.5	190	56.3	68.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-6.8			

Room Checksums

By HDR

114 BREAKROOM

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 96 / 77 / 111

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-73.39	-73.39	-1.61
Infiltration	0		0	0
Sub Total ==>	0	-73	-73	-2
Internal Loads				
Lights	299	299	597	13
People	756	0	756	17
Misc	1,485	0	1,485	32
Sub Total ==>	2,539	299	2,838	62
Ceiling Load	959	-959	0	0
Ventilation Load	0	0	1,371	30
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			435	10
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	3,498	-733	4,570	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	320	10
People	437	13
Misc	1,596	49
Sub Total ==>	2,353	72
Ceiling Load	932	28
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	3,284	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-448.81	13.55
Infiltration	0	0	0.00
Sub Total ==>	0	-449	13.55
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,289	0	0.00
Ventilation Load	0	-1,080	32.60
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-48	1.45
RA Preheat Diff.		-446	13.48
Additional Reheat		0	0.00
System Plenum Heat		-1,289	38.91
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,289	-3,311	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.5	88.3
Ra Plenum	86.1	51.7
Return	74.0	68.0
Ret/OA	76.9	51.0
Fn MtrTD	0.2	0.0
Fn BldTD	0.5	0.0
Fn Frict	1.5	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	191	57
Terminal	191	57
Main Fan	191	57
Sec Fan	0	0
Nom Vent	24	23
AHU Vent	24	23
Infil	0	0
MinStop/Rh	57	57
Return	191	57
Exhaust	24	23
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	12.7	39.8
cfm/ft²	0.77	0.23
cfm/ton	502.29	
ft²/ton	656.42	
Btu/hr·ft²	18.28	-11.45
No. People	1.7	7.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.4	4.6	3.4	183	76.9	64.2	70.3	56.3	56.0	67.2
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.4	4.6								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	250		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.0	57	56.3	88.3
Aux Htg	0.0	0	0.0	0.0
Preheat	-0.8	24	25.2	56.3
Reheat	-0.7	57	56.3	68.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.9			

Room Checksums

By HDR

116 SR TRAFFIC OFFICE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 8 / 12
Outside Air: OADB/WB/HR: 87 / 73 / 99

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	521	0	521	10
Glass/Door Cond	56	0	56	1
Wall Cond	1,414	447	1,861	35
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-26.08	-26.08	-0.49
Infiltration	0		0	0
Sub Total ==>	1,991	421	2,411	45
Internal Loads				
Lights	222	222	445	8
People	383	0	383	7
Misc	481	0	481	9
Sub Total ==>	1,087	222	1,309	24
Ceiling Load	634	-634	0	0
Ventilation Load	0	0	1,157	22
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			490	9
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	3,712	9	5,368	100.00

CLG SPACE PEAK

Mo/Hr: 9 / 12
OADB: 82

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	632	16
Glass/Door Cond	30	1
Wall Cond	1,541	38
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	2,203	54
Internal Loads		
Lights	222	5
People	223	6
Misc	481	12
Sub Total ==>	927	23
Ceiling Load	612	15
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	304	8
Grand Total ==>	4,046	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-212	-212	5.34
Wall Cond	-614	-751	18.92
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-310.58	7.83
Infiltration	0	0	0.00
Sub Total ==>	-826	-1,273	32.09
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-892	0	0.00
Ventilation Load	0	-1,330	33.52
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-59	1.50
RA Preheat Diff.		-550	13.85
Additional Reheat		0	0.00
System Plenum Heat		-755	19.04
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,718	-3,967	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.5	90.0
Ra Plenum	85.6	51.7
Return	74.0	68.0
Ret/OA	75.9	51.0
Fn MtrTD	0.2	0.0
Fn BldTD	0.5	0.0
Fn Frict	1.5	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	236	71
Terminal	236	71
Main Fan	236	71
Sec Fan	0	0
Nom Vent	30	28
AHU Vent	30	28
Infil	0	0
MinStop/Rh	71	71
Return	236	71
Exhaust	30	28
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	12.7	39.8
cfm/ft²	1.36	0.41
cfm/ton	526.82	
ft²/ton	386.75	
Btu/hr·ft²	31.03	-21.14
No. People	1.0	5.8/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.5	5.4	4.5	207	75.9	63.6	69.2	56.3	55.0	63.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.5	5.4								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	173		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	231	12	5
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.6	71	56.3	90.0
Aux Htg	0.0	0	0.0	0.0
Preheat	-1.0	30	25.2	56.3
Reheat	-0.9	71	56.3	68.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-3.7			

Room Checksums

By HDR

117 SR TRAFFIC OFFICE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 12
Outside Air: OADB/WB/HR: 91 / 75 / 104

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	662	0	662	9
Glass/Door Cond	152	0	152	2
Wall Cond	2,097	684	2,781	38
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-41.98	-41.98	-0.57
Infiltration	0		0	0
Sub Total ==>	2,911	642	3,553	48
Internal Loads				
Lights	251	251	501	7
People	383	0	383	5
Misc	481	0	481	7
Sub Total ==>	1,115	251	1,366	18
Ceiling Load	730	-730	0	0
Ventilation Load	0	0	1,844	25
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			635	9
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	4,756	163	7,398	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 11
OADB: 88

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	847	16
Glass/Door Cond	116	2
Wall Cond	2,108	39
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	3,071	57
Internal Loads		
Lights	248	5
People	250	5
Misc	476	9
Sub Total ==>	975	18
Ceiling Load	698	13
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	667	12
Grand Total ==>	5,411	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-424	-424	8.09
Wall Cond	-869	-1,067	20.36
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-350.07	6.68
Infiltration	0	0	0.00
Sub Total ==>	-1,293	-1,841	35.13
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,005	0	0.00
Ventilation Load	0	-1,779	33.94
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-79	1.51
RA Preheat Diff.		-735	14.03
Additional Reheat		0	0.00
System Plenum Heat		-807	15.39
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-2,298	-5,241	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.5	90.0
Ra Plenum	85.8	51.7
Return	74.0	68.0
Ret/OA	76.5	51.0
Fn MtrTD	0.2	0.0
Fn BldTD	0.5	0.0
Fn Frict	1.5	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	315	95
Terminal	315	95
Main Fan	315	95
Sec Fan	0	0
Nom Vent	40	38
AHU Vent	40	38
Infil	0	0
MinStop/Rh	95	95
Return	315	95
Exhaust	40	38
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	12.7	39.8
cfm/ft²	1.62	0.48
cfm/ton	511.23	
ft²/ton	316.30	
Btu/hr·ft²	37.94	-25.08
No. People	1.0	5.1/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.6	7.4	6.1	268	76.5	64.0	70.0	56.3	54.8	62.5
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.6	7.4								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	195		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	336	24	7
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-3.5	95	56.3	90.0
Aux Htg	0.0	0	0.0	0.0
Preheat	-1.4	40	25.2	56.3
Reheat	-1.2	95	56.3	68.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-4.9			

Room Checksums

By HDR

118 FILE ROOM

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 11
Outside Air: OADB/WB/HR: 88 / 72 / 97

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	689	213	902	53
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-7.29	-7.29	-0.43
Infiltration	0		0	0
Sub Total ==>	689	205	895	52
Internal Loads				
Lights	115	115	229	13
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	115	115	229	13
Ceiling Load	208	-208	0	0
Ventilation Load	0	0	444	26
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	25		25	1
Exhaust Heat		0	0	0
Sup. Fan Heat			111	7
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	1,037	112	1,704	100.00

CLG SPACE PEAK

Mo/Hr: 6 / 11
OADB: 86

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	711	32
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	711	32
Internal Loads		
Lights	115	5
People	0	0
Misc	0	0
Sub Total ==>	115	5
Ceiling Load	208	9
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	1,223	54
Grand Total ==>	2,257	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-298	-360	20.18
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-161.57	9.06
Infiltration	0	0	0.00
Sub Total ==>	-298	-521	29.23
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-464	0	0.00
Ventilation Load	0	-590	33.07
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-26	1.47
RA Preheat Diff.		-244	13.67
Additional Reheat		0	0.00
System Plenum Heat		-402	22.55
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-762	-1,784	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.5	90.0
Ra Plenum	85.3	51.7
Return	78.0	68.0
Ret/OA	80.7	51.0
Fn MtrTD	0.2	0.0
Fn BldTD	0.5	0.0
Fn Frict	1.5	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	105	31
Terminal	105	31
Main Fan	105	31
Sec Fan	0	0
Nom Vent	13	12
AHU Vent	13	12
Infil	0	0
MinStop/Rh	31	31
Return	105	31
Exhaust	13	12
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	12.7	39.8
cfm/ft²	1.16	0.35
cfm/ton	736.14	
ft²/ton	633.73	
Btu/hr·ft²	18.94	-18.02
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.1	1.7	1.4	47	80.7	66.1	73.5	56.3	54.2	60.1
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.1	1.7								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	90		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	104	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.2	31	56.3	90.0
Aux Htg	0.0	0	0.0	0.0
Preheat	-0.5	13	25.2	56.3
Reheat	-0.4	31	56.3	68.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-1.6			

Room Checksums

By HDR

119 COMM

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 6 / 11
Outside Air: OADB/WB/HR: 86 / 69 / 83

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	892	265	1,157	16
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-10.56	-10.56	-0.14
Infiltration	0		0	0
Sub Total ==>	892	255	1,147	15
Internal Loads				
Lights	140	140	280	4
People	0	0	0	0
Misc	6,000	0	6,000	81
Sub Total ==>	6,140	140	6,280	84
Ceiling Load	396	-396	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			21	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	7,428	-1	7,448	100.00

CLG SPACE PEAK

Mo/Hr: 6 / 11
OADB: 86

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	892	12
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	892	12
Internal Loads		
Lights	140	2
People	0	0
Misc	6,000	81
Sub Total ==>	6,140	83
Ceiling Load	396	5
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	7,428	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-360	-448	33.45
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-581.06	43.39
Infiltration	0	0	0.00
Sub Total ==>	-360	-1,029	76.84
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-398	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-310	23.16
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-758	-1,339	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	69.9
Ra Plenum	85.4	56.6
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	354	354
Terminal	354	354
Main Fan	354	354
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	0	0
Return	354	354
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	3.22	3.22
cfm/ton	570.28	
ft²/ton	177.23	
Btu/hr·ft²	67.71	-6.89
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.6	7.5	7.5	354	74.1	56.6	41.4	55.0	48.6	41.1
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.6	7.5								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	110		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	126	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.8	354	68.0	69.9
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-0.8			

Room Checksums

By HDR

120 MECH/ELEC ROOM

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 17
Outside Air: OADB/WB/HR: 94 / 75 / 105

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	393	0	393	13
Glass Solar	0	0	0	0
Glass/Door Cond	115	0	115	4
Wall Cond	1,546	0	1,546	50
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	550		550	18
Sub Total ==>	2,603	0	2,603	85
Internal Loads				
Lights	459	0	459	15
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	459	0	459	15
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			9	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	3,062	0	3,071	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	393	14
Glass Solar	0	0
Glass/Door Cond	115	4
Wall Cond	1,546	56
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	244	9
Sub Total ==>	2,298	83
Internal Loads		
Lights	459	17
People	0	0
Misc	0	0
Sub Total ==>	459	17
Ceiling Load	0	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	2,757	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	-145	-145	8.58
Glass Solar	0	0	0.00
Glass/Door Cond	-228	-228	13.51
Wall Cond	-788	-788	46.67
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	0.00	0.00
Infiltration	-527	-527	31.24
Sub Total ==>	-1,688	-1,688	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	0	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,688	-1,688	100.00

TEMPERATURES

	Cooling	Heating
SADB	64.1	64.8
Ra Plenum	80.0	55.0
Return	80.0	55.0
Ret/OA	80.0	55.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	157	157
Terminal	157	157
Main Fan	157	157
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	16	16
MinStop/Rh	0	0
Return	173	173
Exhaust	16	16
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.87	0.87
cfm/ton	611.68	
ft²/ton	703.29	
Btu/hr·ft²	17.06	-9.38
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.3	3.1	2.8	157	80.1	66.6	77.5	64.1	60.7	74.8
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.3	3.1								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	180		
Part	0		
Int Door	0		
ExFlr	0		
Roof	180	0	0
Wall	297	0	0
Ext Door	21	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.7	157	55.0	64.8
Aux Htg	0.0	0	0.0	0.0
Preheat	-1.6	157	55.0	64.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-1.7			

Room Checksums

By HDR

ATTIC

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 16
Outside Air: OADB/WB/HR: 95 / 76 / 107

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	9,991	9,991	53
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	7,601	100	7,701	41
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	1,103.05	0.00	1,103.05	5.87
Infiltration	0		0	0
Sub Total ==>	8,704	10,091	18,795	100
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	1,487	-1,487	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	10,191	8,604	18,795	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	8,820	81
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	901.73	8.30
Infiltration	0	0
Sub Total ==>	9,722	90
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load	1,140	10
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	10,862	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-4,040	-25.25
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-2,510	-2,553	-15.95
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	8,462.38	8,462.38	52.88
Infiltration	0	0	0.00
Sub Total ==>	5,952	1,870	11.68
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	10,050	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		14,132	88.32
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	16,002	16,002	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.5	45.0
Ra Plenum	86.0	51.7
Return	86.0	51.7
Ret/OA	87.2	25.2
Fn MtrTD	0.2	0.0
Fn BldTD	0.5	0.0
Fn Frict	1.5	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	0
Terminal	0	0
Main Fan	0	0
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	0	0
Return	0	0
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	12.7	0.0
cfm/ft²	0.00	0.00
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	0.00
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	4,710		
Part	0		
Int Door	0		
ExFlr	4,723		
Roof	4,745	0	0
Wall	1,152	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	0.0	0	0.0	0.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	48.4	56.3
Reheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	0.0			

Room Checksums

By HDR

HALLWAY

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 12
Outside Air: OADB/WB/HR: 91 / 75 / 104

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	426	0	426	3
Glass/Door Cond	331	0	331	3
Wall Cond	2,193	722	2,915	23
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-132.40	-132.40	-1.05
Infiltration	1,278		1,278	10
Sub Total ==>	4,228	589	4,818	38
Internal Loads				
Lights	798	798	1,595	13
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	798	798	1,595	13
Ceiling Load	2,301	-2,301	0	0
Ventilation Load	0	0	5,258	42
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			907	7
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	7,327	-914	12,578	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 11
OADB: 88

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	499	3
Glass/Door Cond	257	2
Wall Cond	2,437	16
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	413	3
Sub Total ==>	3,605	23
Internal Loads		
Lights	787	5
People	0	0
Misc	0	0
Sub Total ==>	787	5
Ceiling Load	2,203	14
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	8,834	57
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	15,429	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-860	-860	5.72
Wall Cond	-1,212	-1,504	10.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-1,104.07	7.34
Infiltration	-1,308	-1,308	8.69
Sub Total ==>	-3,381	-4,777	31.74
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-3,170	0	0.00
Ventilation Load	0	-5,071	33.70
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-226	1.50
RA Preheat Diff.		-2,096	13.93
Additional Reheat		0	0.00
System Plenum Heat		-2,878	19.12
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-6,551	-15,048	100.00

TEMPERATURES

	Cooling	Heating
SADB	58.5	90.0
Ra Plenum	85.8	51.7
Return	74.0	68.0
Ret/OA	79.1	51.0
Fn MtrTD	0.2	0.0
Fn BldTD	0.5	0.0
Fn Frict	1.5	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	899	270
Terminal	899	270
Main Fan	899	270
Sec Fan	0	0
Nom Vent	114	107
AHU Vent	114	107
Infil	28	28
MinStop/Rh	270	270
Return	926	297
Exhaust	142	135
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	12.7	39.8
cfm/ft²	1.46	0.44
cfm/ton	857.33	
ft²/ton	586.74	
Btu/hr·ft²	20.45	-22.67
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	1.1	12.6	8.7	383	79.1	66.0	75.9	56.3	55.4	64.9
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	1.1	12.6								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	615		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	462	20	4
Ext Door	33	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-10.0	270	56.3	90.0
Aux Htg	0.0	0	0.0	0.0
Preheat	-3.9	114	25.2	56.3
Reheat	-3.5	270	56.3	68.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-13.9			

Room Checksums

By HDR

100 VESTIBULE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 0 / 0
Outside Air: OADB/WB/HR: 0 / 0 / 0

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	0		0	0
Sub Total ==>	0	0	0	0
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	0	0	0	100.00

CLG SPACE PEAK

Mo/Hr: 0 / 0
OADB: 0

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load		0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	0	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-80	3.93
Glass Solar	0	0	0.00
Glass/Door Cond	-751	-751	37.06
Wall Cond	-766	-1,000	49.36
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	0.00	0.00
Infiltration	-196	-196	9.66
Sub Total ==>	-1,713	-2,027	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-314	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-2,027	-2,027	100.00

TEMPERATURES

	Cooling	Heating
SADB	0.0	125.0
Ra Plenum	0.0	57.2
Return	0.0	68.0
Ret/OA	0.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	32
Terminal	0	32
Main Fan	0	32
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	4
MinStop/Rh	0	0
Return	0	36
Exhaust	0	4
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.00	0.35
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	-22.03
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	92		
Part	0		
Int Door	0		
ExFlr	0		
Roof	92	0	0
Wall	303	20	7
Ext Door	26	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.0	32	68.0	125.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.0			

Room Checksums

By HDR

101 LOBBY

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 16
Outside Air: OADB/WB/HR: 95 / 76 / 107

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	1,377	0	1,377	5
Glass/Door Cond	331	0	331	1
Wall Cond	2,737	932	3,669	12
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	602.44	602.44	1.97
Infiltration	2,084		2,084	7
Sub Total ==>	6,528	1,534	8,063	26
Internal Loads				
Lights	1,057	1,057	2,113	7
People	5,400	0	5,400	18
Misc	1,536	0	1,536	5
Sub Total ==>	7,993	1,057	9,049	30
Ceiling Load	2,281	-2,281	0	0
Ventilation Load	0	0	6,940	23
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			6,141	20
Ov/Undr Sizing	140		140	0
Exhaust Heat		0	0	0
Sup. Fan Heat			197	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	16,942	310	30,531	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	1,493	11
Glass/Door Cond	312	2
Wall Cond	3,204	23
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	846	6
Sub Total ==>	5,856	42
Internal Loads		
Lights	1,101	8
People	3,000	21
Misc	1,596	11
Sub Total ==>	5,696	41
Ceiling Load	2,362	17
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	140	1
Grand Total ==>	14,054	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-636	-636	2.41
Wall Cond	-1,183	-1,509	5.72
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-4,916.62	18.64
Infiltration	-1,829	-1,829	6.94
Sub Total ==>	-3,648	-8,891	33.71
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-3,014	0	0.00
Ventilation Load	0	-6,094	23.10
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-1,829	-1,829	6.94
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-6,874	26.06
System Plenum Heat		-2,688	10.19
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-8,492	-26,376	100.00

TEMPERATURES

	Cooling	Heating
SADB	54.9	79.5
Ra Plenum	82.4	56.9
Return	74.0	68.0
Ret/OA	78.1	59.7
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	666	666
Terminal	666	666
Main Fan	666	666
Sec Fan	0	0
Nom Vent	129	129
AHU Vent	129	129
Infil	39	39
MinStop/Rh	666	666
Return	705	705
Exhaust	168	168
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	19.3	19.3
cfm/ft²	0.77	0.77
cfm/ton	234.00	
ft²/ton	302.04	
Btu/hr·ft²	39.73	-31.19
No. People	12.0	14.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	2.9	34.2	20.1	666	78.1	64.9	71.9	50.4	46.9	42.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	2.9	34.2								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	860		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	462	36	8
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-26.8	666	50.4	79.5
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-17.4	666	50.4	74.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-26.8			

Room Checksums

By HDR

102 WOMENS RR

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 17
Outside Air: OADB/WB/HR: 94 / 75 / 105

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	631	191	822	40
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	43.49	43.49	2.10
Infiltration	0		0	0
Sub Total ==>	631	234	866	42
Internal Loads				
Lights	89	89	178	9
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	89	89	178	9
Ceiling Load	192	-192	0	0
Ventilation Load	0	0	518	25
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			483	23
Ov/Undr Sizing	11		11	1
Exhaust Heat		0	0	0
Sup. Fan Heat			16	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	924	131	2,072	100.00

CLG SPACE PEAK

Mo/Hr: 6 / 19
OADB: 87

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	848	76
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	848	76
Internal Loads		
Lights	72	7
People	0	0
Misc	0	0
Sub Total ==>	72	7
Ceiling Load	183	16
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	11	1
Grand Total ==>	1,114	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-291	-363	17.68
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-355.08	17.27
Infiltration	0	0	0.00
Sub Total ==>	-291	-719	34.95
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-245	0	0.00
Ventilation Load	0	-483	23.49
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-136	-136	6.63
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-545	26.50
System Plenum Heat		-173	8.43
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-673	-2,056	100.00

TEMPERATURES

	Cooling	Heating
SADB	54.9	79.5
Ra Plenum	82.7	56.9
Return	74.0	68.0
Ret/OA	77.8	59.7
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	53	53
Terminal	53	53
Main Fan	53	53
Sec Fan	0	0
Nom Vent	10	10
AHU Vent	10	10
Infil	0	0
MinStop/Rh	53	53
Return	53	53
Exhaust	10	10
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	19.3	19.3
cfm/ft²	0.75	0.75
cfm/ton	274.54	
ft²/ton	363.87	
Btu/hr·ft²	32.98	-30.38
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.2	2.3	1.5	53	77.8	64.7	71.5	50.4	49.7	52.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.2	2.3								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	70		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	102	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.1	53	50.4	79.5
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-1.4	53	50.4	74.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.1			

Room Checksums

By HDR

103 MENS RR

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 96 / 77 / 111

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	50.17	50.17	8.14
Infiltration	0		0	0
Sub Total ==>	0	50	50	8
Internal Loads				
Lights	78	78	155	25
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	78	78	155	25
Ceiling Load	167	-167	0	0
Ventilation Load	0	0	197	32
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			93	15
Ov/Undr Sizing	115		115	19
Exhaust Heat		0	0	0
Sup. Fan Heat			5	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	360	-39	616	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	83	22
People	0	0
Misc	0	0
Sub Total ==>	83	22
Ceiling Load	179	47
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	115	31
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	377	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-398.57	40.91
Infiltration	0	0	0.00
Sub Total ==>	0	-399	40.91
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-228	0	0.00
Ventilation Load	0	-164	16.78
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-184	18.93
System Plenum Heat		-228	23.38
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-228	-974	100.00

TEMPERATURES

	Cooling	Heating
SADB	54.9	79.5
Ra Plenum	82.1	56.9
Return	74.0	68.0
Ret/OA	78.3	59.7
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	18	18
Terminal	18	18
Main Fan	18	18
Sec Fan	0	0
Nom Vent	3	3
AHU Vent	3	3
Infil	0	0
MinStop/Rh	18	18
Return	18	18
Exhaust	3	3
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	19.3	19.3
cfm/ft²	0.28	0.28
cfm/ton	316.69	
ft²/ton	1,151.50	
Btu/hr·ft²	10.42	-11.07
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.1	0.7	0.5	18	78.3	65.1	72.6	50.4	50.3	54.7
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.1	0.7								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	65		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.7	18	50.4	79.5
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-0.5	18	50.4	74.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-0.7			

Room Checksums

By HDR

104 WOMENS RR

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 17
Outside Air: OADB/WB/HR: 94 / 75 / 105

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	646	195	842	40
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	42.25	42.25	2.01
Infiltration	0		0	0
Sub Total ==>	646	238	884	42
Internal Loads				
Lights	87	87	173	8
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	87	87	173	8
Ceiling Load	187	-187	0	0
Ventilation Load	0	0	524	25
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			489	23
Ov/Undr Sizing	11		11	1
Exhaust Heat		0	0	0
Sup. Fan Heat			16	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	931	137	2,098	100.00

CLG SPACE PEAK

Mo/Hr: 6 / 19
OADB: 87

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	868	77
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	868	77
Internal Loads		
Lights	70	6
People	0	0
Misc	0	0
Sub Total ==>	70	6
Ceiling Load	177	16
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	11	1
Grand Total ==>	1,127	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-298	-372	18.04
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-341.45	16.56
Infiltration	0	0	0.00
Sub Total ==>	-298	-713	34.60
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-238	0	0.00
Ventilation Load	0	-489	23.70
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-144	-144	7.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-551	26.73
System Plenum Heat		-165	7.98
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-681	-2,062	100.00

TEMPERATURES

	Cooling	Heating
SADB	54.9	79.5
Ra Plenum	82.7	56.9
Return	74.0	68.0
Ret/OA	77.8	59.7
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	53	53
Terminal	53	53
Main Fan	53	53
Sec Fan	0	0
Nom Vent	10	10
AHU Vent	10	10
Infil	0	0
MinStop/Rh	53	53
Return	53	53
Exhaust	10	10
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	19.3	19.3
cfm/ft²	0.79	0.79
cfm/ton	274.29	
ft²/ton	349.15	
Btu/hr·ft²	34.37	-31.63
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.2	2.3	1.6	53	77.8	64.7	71.5	50.4	49.7	52.3
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.2	2.3								

AREAS

	Gross Total ft²	Glass ft²	Glass (%)
Floor	68		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	104	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.2	53	50.4	79.5
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-1.4	53	50.4	74.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.2			

Room Checksums

By HDR

105 MENS RR

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 96 / 77 / 111

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	47.85	47.85	8.14
Infiltration	0		0	0
Sub Total ==>	0	48	48	8
Internal Loads				
Lights	74	74	148	25
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	74	74	148	25
Ceiling Load	159	-159	0	0
Ventilation Load	0	0	188	32
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			89	15
Ov/Undr Sizing	110		110	19
Exhaust Heat		0	0	0
Sup. Fan Heat			5	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
***Grand Total* ==>**	343	-37	588	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	79	22
People	0	0
Misc	0	0
Sub Total ==>	79	22
Ceiling Load	170	47
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	110	31
***Grand Total* ==>**	360	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-380.17	40.91
Infiltration	0	0	0.00
Sub Total ==>	0	-380	40.91
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-217	0	0.00
Ventilation Load	0	-156	16.78
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-176	18.93
System Plenum Heat		-217	23.38
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
***Grand Total* ==>**	-217	-929	100.00

TEMPERATURES

	Cooling	Heating
SADB	54.9	79.5
Ra Plenum	82.1	56.9
Return	74.0	68.0
Ret/OA	78.3	59.7
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	17	17
Terminal	17	17
Main Fan	17	17
Sec Fan	0	0
Nom Vent	3	3
AHU Vent	3	3
Infil	0	0
MinStop/Rh	17	17
Return	17	17
Exhaust	3	3
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	19.3	19.3
cfm/ft²	0.28	0.28
cfm/ton	316.69	
ft²/ton	1,151.49	
Btu/hr·ft²	10.42	-11.07
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.1	0.7	0.4	17	78.3	65.1	72.6	50.4	50.3	54.7
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.1	0.7								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	62		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.7	17	50.4	79.5
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-0.4	17	50.4	74.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-0.7			

Room Checksums

By HDR

106 VCC OFFICE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 96 / 77 / 111

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	320.29	320.29	4.35
Infiltration	0		0	0
Sub Total ==>	0	320	320	4
Internal Loads				
Lights	496	496	991	13
People	865	0	865	12
Misc	1,485	0	1,485	20
Sub Total ==>	2,845	496	3,341	45
Ceiling Load	1,066	-1,066	0	0
Ventilation Load	0	0	1,990	27
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			1,612	22
Ov/Undr Sizing	38		38	1
Exhaust Heat		0	0	0
Sup. Fan Heat			53	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	3,949	-250	7,355	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	531	14
People	500	13
Misc	1,596	42
Sub Total ==>	2,627	69
Ceiling Load	1,140	30
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	38	1
Grand Total ==>	3,805	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-2,544.70	30.46
Infiltration	0	0	0.00
Sub Total ==>	0	-2,545	30.46
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,454	0	0.00
Ventilation Load	0	-1,650	19.75
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-844	-844	10.11
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-1,861	22.27
System Plenum Heat		-1,454	17.41
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-2,299	-8,354	100.00

TEMPERATURES

	Cooling	Heating
SADB	54.9	79.5
Ra Plenum	82.1	56.9
Return	74.0	68.0
Ret/OA	78.3	59.7
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	180	180
Terminal	180	180
Main Fan	180	180
Sec Fan	0	0
Nom Vent	35	35
AHU Vent	35	35
Infil	0	0
MinStop/Rh	180	180
Return	180	180
Exhaust	35	35
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	19.3	19.3
cfm/ft²	0.43	0.43
cfm/ton	263.59	
ft²/ton	606.49	
Btu/hr·ft²	19.79	-17.50
No. People	2.0	4.8/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.7	8.2	5.0	180	78.3	65.1	72.6	50.4	49.5	51.5
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.7	8.2								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	415		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-7.3	180	50.4	79.5
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-4.7	180	50.4	74.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-7.3			

Room Checksums

By HDR

107 JANITORS

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 96 / 77 / 111

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	50.17	50.17	8.14
Infiltration	0		0	0
Sub Total ==>	0	50	50	8
Internal Loads				
Lights	78	78	155	25
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	78	78	155	25
Ceiling Load	167	-167	0	0
Ventilation Load	0	0	197	32
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			93	15
Ov/Undr Sizing	115		115	19
Exhaust Heat		0	0	0
Sup. Fan Heat			5	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	360	-39	616	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	83	22
People	0	0
Misc	0	0
Sub Total ==>	83	22
Ceiling Load	179	47
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	115	31
Grand Total ==>	377	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-398.57	40.91
Infiltration	0	0	0.00
Sub Total ==>	0	-399	40.91
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-228	0	0.00
Ventilation Load	0	-164	16.78
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-184	18.93
System Plenum Heat		-228	23.38
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-228	-974	100.00

TEMPERATURES

	Cooling	Heating
SADB	54.9	79.5
Ra Plenum	82.1	56.9
Return	74.0	68.0
Ret/OA	78.3	59.7
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	18	18
Terminal	18	18
Main Fan	18	18
Sec Fan	0	0
Nom Vent	3	3
AHU Vent	3	3
Infil	0	0
MinStop/Rh	18	18
Return	18	18
Exhaust	3	3
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	19.3	19.3
cfm/ft²	0.28	0.28
cfm/ton	316.69	
ft²/ton	1,151.50	
Btu/hr·ft²	10.42	-11.07
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.1	0.7	0.5	18	78.3	65.1	72.6	50.4	50.3	54.7
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.1	0.7								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	65		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.7	18	50.4	79.5
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-0.5	18	50.4	74.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-0.7			

Room Checksums

By HDR

108 STORAGE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 96 / 77 / 111

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	65.60	65.60	6.22
Infiltration	0		0	0
Sub Total ==>	0	66	66	6
Internal Loads				
Lights	102	102	203	19
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	102	102	203	19
Ceiling Load	111	-111	0	0
Ventilation Load	0	0	238	23
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			179	17
Ov/Undr Sizing	362		362	34
Exhaust Heat		0	0	0
Sup. Fan Heat			7	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	574	57	1,055	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	109	18
People	0	0
Misc	0	0
Sub Total ==>	109	18
Ceiling Load	126	21
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	362	61
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	596	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-521.20	40.91
Infiltration	0	0	0.00
Sub Total ==>	0	-521	40.91
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-298	0	0.00
Ventilation Load	0	-214	16.78
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-241	18.93
System Plenum Heat		-298	23.38
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-298	-1,274	100.00

TEMPERATURES

	Cooling	Heating
SADB	54.9	79.5
Ra Plenum	82.1	56.9
Return	78.0	68.0
Ret/OA	81.5	59.7
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	23	23
Terminal	23	23
Main Fan	23	23
Sec Fan	0	0
Nom Vent	5	5
AHU Vent	5	5
Infil	0	0
MinStop/Rh	23	23
Return	23	23
Exhaust	5	5
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	19.3	19.3
cfm/ft²	0.28	0.28
cfm/ton	247.85	
ft²/ton	901.22	
Btu/hr·ft²	13.32	-11.07
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.1	1.1	0.8	23	81.5	66.1	72.6	50.4	49.7	52.5
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.1	1.1								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	85		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.9	23	50.4	79.5
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-0.7	23	50.4	78.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-0.9			

Room Checksums

By HDR

109 VESTIBULE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 0 / 0
Outside Air: OADB/WB/HR: 0 / 0 / 0

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	0		0	0
Sub Total ==>	0	0	0	0
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	0	0	0	100.00

CLG SPACE PEAK

Mo/Hr: 0 / 0
OADB: 0

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load	0	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	0	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-751	-751	28.34
Wall Cond	-598	-777	29.31
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-548.99	20.72
Infiltration	-255	-255	9.63
Sub Total ==>	-1,604	-2,332	88.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-497	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-318	12.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-2,101	-2,650	100.00

TEMPERATURES

	Cooling	Heating
SADB	0.0	125.0
Ra Plenum	0.0	54.9
Return	0.0	68.0
Ret/OA	0.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	33
Terminal	0	33
Main Fan	0	33
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	5
MinStop/Rh	0	0
Return	0	39
Exhaust	0	5
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.00	0.28
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	-17.51
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	120		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	245	20	8
Ext Door	26	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.1	33	68.0	125.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.1			

Room Checksums

By HDR

110 MMT CARRIER

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 17
Outside Air: OADB/WB/HR: 94 / 75 / 105

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	1,773	525	2,299	23
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-148.25	-148.25	-1.46
Infiltration	0		0	0
Sub Total ==>	1,773	377	2,150	21
Internal Loads				
Lights	293	293	586	6
People	900	0	900	9
Misc	952	0	952	9
Sub Total ==>	2,145	293	2,438	24
Ceiling Load	978	-978	0	0
Ventilation Load	0	0	1,950	19
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			3,162	31
Ov/Undr Sizing	346		346	3
Exhaust Heat		0	0	0
Sup. Fan Heat			77	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	5,242	-308	10,124	100.00

CLG SPACE PEAK

Mo/Hr: 9 / 17
OADB: 85

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	2,208	43
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	2,208	43
Internal Loads		
Lights	293	6
People	500	10
Misc	952	18
Sub Total ==>	1,745	34
Ceiling Load	897	17
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	346	7
Grand Total ==>	5,196	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-627	-742	7.76
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-223.99	2.34
Infiltration	0	0	0.00
Sub Total ==>	-627	-966	10.10
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,410	0	0.00
Ventilation Load	0	-1,782	18.63
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-2,539	-2,539	26.55
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-2,982	31.18
System Plenum Heat		-1,295	13.55
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-4,576	-9,563	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.0	83.9
Ra Plenum	87.4	48.7
Return	74.0	68.0
Ret/OA	76.9	61.8
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	261	261
Terminal	261	261
Main Fan	261	261
Sec Fan	0	0
Nom Vent	38	38
AHU Vent	38	38
Infil	0	0
MinStop/Rh	261	261
Return	261	261
Exhaust	38	38
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	14.5	14.5
cfm/ft²	1.13	1.13
cfm/ton	281.46	
ft²/ton	248.29	
Btu/hr·ft²	48.33	-50.76
No. People	2.0	8.7/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.9	11.1	7.0	261	76.9	63.7	68.2	51.5	48.8	47.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.9	11.1								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	230		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	220	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-11.7	261	51.5	83.9
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-6.5	261	51.5	74.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-11.7			

Room Checksums

By HDR

111 TRAF CHECK IN

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 17
Outside Air: OADB/WB/HR: 94 / 75 / 105

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-103.13	-103.13	-3.34
Infiltration	0		0	0
Sub Total ==>	0	-103	-103	-3
Internal Loads				
Lights	205	205	410	13
People	450	0	450	15
Misc	479	0	479	15
Sub Total ==>	1,133	205	1,338	43
Ceiling Load	680	-680	0	0
Ventilation Load	0	0	649	21
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			1,065	34
Ov/Undr Sizing	115		115	4
Exhaust Heat		0	0	0
Sup. Fan Heat			26	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
***Grand Total* ==>**	1,929	-579	3,090	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	205	12
People	250	14
Misc	479	28
Sub Total ==>	933	54
Ceiling Load	680	39
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	115	7
***Grand Total* ==>**	1,729	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-155.82	4.78
Infiltration	0	0	0.00
Sub Total ==>	0	-156	4.78
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-981	0	0.00
Ventilation Load	0	-593	18.17
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-542	-542	16.60
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-992	30.40
System Plenum Heat		-981	30.06
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
***Grand Total* ==>**	-1,522	-3,263	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.0	83.9
Ra Plenum	87.4	48.7
Return	74.0	68.0
Ret/OA	76.9	61.8
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	87	87
Terminal	87	87
Main Fan	87	87
Sec Fan	0	0
Nom Vent	13	13
AHU Vent	13	13
Infil	0	0
MinStop/Rh	87	87
Return	87	87
Exhaust	13	13
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	14.5	14.5
cfm/ft²	0.54	0.54
cfm/ton	308.30	
ft²/ton	568.64	
Btu/hr·ft²	21.10	-24.28
No. People	1.0	6.3/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.3	3.4	2.0	87	76.9	63.7	68.2	51.5	50.2	52.7
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.3	3.4								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	160		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-3.9	87	51.5	83.9
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-2.2	87	51.5	74.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-3.9			

Room Checksums

By HDR

112 OPEN OFFICE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 96 / 77 / 111

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	439	0	439	1
Glass/Door Cond	329	0	329	1
Wall Cond	3,573	1,034	4,607	14
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-637.81	-637.81	-2.00
Infiltration	0		0	0
Sub Total ==>	4,341	396	4,737	15
Internal Loads				
Lights	876	876	1,751	5
People	2,420	0	2,420	8
Misc	3,816	0	3,816	12
Sub Total ==>	7,111	876	7,987	25
Ceiling Load	3,337	-3,337	0	0
Ventilation Load	0	0	7,256	23
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			10,506	33
Ov/Undr Sizing	1,146		1,146	4
Exhaust Heat		0	0	0
Sup. Fan Heat			256	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	15,935	-2,066	31,888	100.00

CLG SPACE PEAK

Mo/Hr: 9 / 12
OADB: 82

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	1,897	11
Glass/Door Cond	90	1
Wall Cond	4,588	27
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	6,575	38
Internal Loads		
Lights	951	6
People	1,340	8
Misc	4,171	24
Sub Total ==>	6,462	38
Ceiling Load	3,046	18
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	1,146	7
Grand Total ==>	17,229	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-636	-636	2.01
Wall Cond	-2,014	-2,407	7.60
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-720.66	2.27
Infiltration	0	0	0.00
Sub Total ==>	-2,650	-3,764	11.88
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-4,536	0	0.00
Ventilation Load	0	-5,908	18.65
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-7,987	-7,987	25.20
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-9,886	31.20
System Plenum Heat		-4,143	13.08
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-15,173	-31,688	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.0	83.9
Ra Plenum	88.2	48.7
Return	74.0	68.0
Ret/OA	77.2	61.8
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	865	865
Terminal	865	865
Main Fan	865	865
Sec Fan	0	0
Nom Vent	125	125
AHU Vent	125	125
Infil	0	0
MinStop/Rh	865	865
Return	865	865
Exhaust	125	125
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	14.5	14.5
cfm/ft²	1.17	1.17
cfm/ton	297.06	
ft²/ton	254.27	
Btu/hr·ft²	47.19	-52.31
No. People	6.0	8.1/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	2.9	34.9	21.1	865	77.2	64.0	69.0	51.5	50.0	51.9
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	2.9	34.9								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	740		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	753	36	5
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-38.7	865	51.5	83.9
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-21.5	865	51.5	74.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-38.7			

Room Checksums

By HDR

113 CONFERENCE/TRAINING

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 16
Outside Air: OADB/WB/HR: 95 / 76 / 107

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-273.40	-273.40	-1.77
Infiltration	0		0	0
Sub Total ==>	0	-273	-273	-2
Internal Loads				
Lights	430	430	860	6
People	6,300	0	6,300	41
Misc	983	0	983	6
Sub Total ==>	7,713	430	8,143	53
Ceiling Load	1,545	-1,545	0	0
Ventilation Load	0	0	2,753	18
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			4,230	27
Ov/Undr Sizing	460		460	3
Exhaust Heat		0	0	0
Sup. Fan Heat			103	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	9,718	-1,388	15,416	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 16
OADB: 95

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	430	6
People	3,500	51
Misc	983	14
Sub Total ==>	4,913	71
Ceiling Load	1,545	22
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	460	7
Grand Total ==>	6,918	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-340.85	2.67
Infiltration	0	0	0.00
Sub Total ==>	0	-341	2.67
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-2,146	0	0.00
Ventilation Load	0	-2,372	18.57
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-3,947	-3,947	30.89
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-3,970	31.07
System Plenum Heat		-2,146	16.79
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-6,093	-12,776	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.0	83.9
Ra Plenum	87.9	48.7
Return	74.0	68.0
Ret/OA	77.1	61.8
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	347	347
Terminal	347	347
Main Fan	347	347
Sec Fan	0	0
Nom Vent	50	50
AHU Vent	50	50
Infil	0	0
MinStop/Rh	347	347
Return	347	347
Exhaust	50	50
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	14.5	14.5
cfm/ft²	0.99	0.99
cfm/ton	244.68	
ft²/ton	246.70	
Btu/hr·ft²	48.64	-44.41
No. People	14.0	40.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	1.4	17.0	8.9	347	77.1	63.9	68.5	51.5	46.3	38.8
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	1.4	17.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	350		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-15.5	347	51.5	83.9
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-8.6	347	51.5	74.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-15.5			

Room Checksums

By HDR

114 BREAKROOM

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 96 / 77 / 111

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	192.94	192.94	3.20
Infiltration	0		0	0
Sub Total ==>	0	193	193	3
Internal Loads				
Lights	299	299	597	10
People	756	0	756	13
Misc	1,485	0	1,485	25
Sub Total ==>	2,539	299	2,838	47
Ceiling Load	642	-642	0	0
Ventilation Load	0	0	1,606	27
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			1,324	22
Ov/Undr Sizing	31		31	1
Exhaust Heat		0	0	0
Sup. Fan Heat			43	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	3,212	-150	6,035	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	320	10
People	437	14
Misc	1,596	52
Sub Total ==>	2,353	77
Ceiling Load	687	22
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	31	1
Grand Total ==>	3,070	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-1,532.95	24.64
Infiltration	0	0	0.00
Sub Total ==>	0	-1,533	24.64
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-876	0	0.00
Ventilation Load	0	-1,331	21.40
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-979	-979	15.73
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-1,501	24.14
System Plenum Heat		-876	14.08
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,855	-6,220	100.00

TEMPERATURES

	Cooling	Heating
SADB	54.9	79.5
Ra Plenum	82.1	56.9
Return	74.0	68.0
Ret/OA	78.3	59.7
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	146	146
Terminal	146	146
Main Fan	146	146
Sec Fan	0	0
Nom Vent	28	28
AHU Vent	28	28
Infil	0	0
MinStop/Rh	146	146
Return	146	146
Exhaust	28	28
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	19.3	19.3
cfm/ft²	0.58	0.58
cfm/ton	259.23	
ft²/ton	445.29	
Btu/hr·ft²	26.95	-23.44
No. People	1.7	7.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.6	6.7	4.1	146	78.3	65.1	72.6	50.4	49.1	50.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.6	6.7								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	250		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-5.9	146	50.4	79.5
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-3.8	146	50.4	74.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-5.9			

Room Checksums

By HDR

116 SR TRAFFIC OFFICE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 96 / 77 / 111

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	146	0	146	2
Glass/Door Cond	110	0	110	1
Wall Cond	1,115	326	1,441	20
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-149.11	-149.11	-2.02
Infiltration	0		0	0
Sub Total ==>	1,371	177	1,548	21
Internal Loads				
Lights	205	205	409	6
People	403	0	403	5
Misc	440	0	440	6
Sub Total ==>	1,048	205	1,253	17
Ceiling Load	780	-780	0	0
Ventilation Load	0	0	1,734	23
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			2,510	34
Ov/Undr Sizing	274		274	4
Exhaust Heat		0	0	0
Sup. Fan Heat			61	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	3,473	-399	7,379	100.00

CLG SPACE PEAK

Mo/Hr: 9 / 12
OADB: 82

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	632	15
Glass/Door Cond	30	1
Wall Cond	1,541	37
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	2,203	54
Internal Loads		
Lights	222	5
People	223	5
Misc	481	12
Sub Total ==>	927	23
Ceiling Load	712	17
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	274	7
Grand Total ==>	4,116	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-212	-212	2.80
Wall Cond	-614	-735	9.71
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-168.48	2.23
Infiltration	0	0	0.00
Sub Total ==>	-826	-1,115	14.74
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,061	0	0.00
Ventilation Load	0	-1,412	18.65
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-1,738	-1,738	22.97
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-2,362	31.21
System Plenum Heat		-940	12.42
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-3,625	-7,567	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.0	83.9
Ra Plenum	88.2	48.7
Return	74.0	68.0
Ret/OA	77.2	61.8
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	207	207
Terminal	207	207
Main Fan	207	207
Sec Fan	0	0
Nom Vent	30	30
AHU Vent	30	30
Infil	0	0
MinStop/Rh	207	207
Return	207	207
Exhaust	30	30
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	14.5	14.5
cfm/ft²	1.19	1.19
cfm/ton	307.21	
ft²/ton	257.30	
Btu/hr·ft²	46.64	-53.46
No. People	1.0	5.8/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.7	8.1	4.9	207	77.2	64.0	69.0	51.5	50.5	53.8
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.7	8.1								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	173		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	231	12	5
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-9.3	207	51.5	83.9
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-5.1	207	51.5	74.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-9.3			

Room Checksums

By HDR

117 SR TRAFFIC OFFICE

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 11
Outside Air: OADB/WB/HR: 88 / 72 / 97

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	847	0	847	8
Glass/Door Cond	116	0	116	1
Wall Cond	2,108	679	2,787	27
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-106.79	-106.79	-1.05
Infiltration	0		0	0
Sub Total ==>	3,071	572	3,643	36
Internal Loads				
Lights	248	248	497	5
People	450	0	450	4
Misc	476	0	476	5
Sub Total ==>	1,175	248	1,423	14
Ceiling Load	807	-807	0	0
Ventilation Load	0	0	1,487	15
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			3,168	31
Ov/Undr Sizing	346		346	3
Exhaust Heat		0	0	0
Sup. Fan Heat			77	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	5,398	14	10,144	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 11
OADB: 88

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	847	16
Glass/Door Cond	116	2
Wall Cond	2,108	41
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	3,071	59
Internal Loads		
Lights	248	5
People	250	5
Misc	476	9
Sub Total ==>	975	19
Ceiling Load	807	16
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	346	7
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	5,198	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-424	-424	4.45
Wall Cond	-869	-1,044	10.95
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-189.90	1.99
Infiltration	0	0	0.00
Sub Total ==>	-1,293	-1,658	17.39
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,195	0	0.00
Ventilation Load	0	-1,783	18.70
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-2,090	-2,090	21.92
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-2,983	31.29
System Plenum Heat		-1,020	10.70
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-4,578	-9,533	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.0	83.9
Ra Plenum	87.1	48.7
Return	74.0	68.0
Ret/OA	76.0	61.8
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	261	261
Terminal	261	261
Main Fan	261	261
Sec Fan	0	0
Nom Vent	38	38
AHU Vent	38	38
Infil	0	0
MinStop/Rh	261	261
Return	261	261
Exhaust	38	38
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	14.5	14.5
cfm/ft²	1.34	1.34
cfm/ton	281.01	
ft²/ton	210.07	
Btu/hr·ft²	57.12	-59.89
No. People	1.0	5.1/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.9	11.1	7.4	261	76.0	63.2	67.1	51.5	48.0	44.7
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.9	11.1								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	195		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	336	24	7
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-11.7	261	51.5	83.9
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-6.5	261	51.5	74.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-11.7			

Room Checksums

By HDR

118 FILE ROOM

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 11
Outside Air: OADB/WB/HR: 88 / 72 / 97

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	689	209	898	45
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-49.29	-49.29	-2.46
Infiltration	0		0	0
Sub Total ==>	689	159	849	42
Internal Loads				
Lights	115	115	229	11
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	115	115	229	11
Ceiling Load	258	-258	0	0
Ventilation Load	0	0	245	12
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			575	29
Ov/Undr Sizing	95		95	5
Exhaust Heat		0	0	0
Sup. Fan Heat			14	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	1,157	16	2,007	100.00

CLG SPACE PEAK

Mo/Hr: 6 / 11
OADB: 86

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	711	60
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	711	60
Internal Loads		
Lights	115	10
People	0	0
Misc	0	0
Sub Total ==>	115	10
Ceiling Load	258	22
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	95	8
Grand Total ==>	1,179	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-298	-353	19.36
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-87.65	4.81
Infiltration	0	0	0.00
Sub Total ==>	-298	-440	24.16
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-552	0	0.00
Ventilation Load	0	-331	18.16
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-554	30.39
System Plenum Heat		-497	27.28
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-850	-1,822	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.0	83.9
Ra Plenum	87.1	48.7
Return	78.0	68.0
Ret/OA	79.4	61.8
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	48	48
Terminal	48	48
Main Fan	48	48
Sec Fan	0	0
Nom Vent	7	7
AHU Vent	7	7
Infil	0	0
MinStop/Rh	48	48
Return	48	48
Exhaust	7	7
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	14.5	14.5
cfm/ft²	0.54	0.54
cfm/ton	263.20	
ft²/ton	489.11	
Btu/hr·ft²	24.53	-24.09
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.2	2.2	1.5	48	79.4	64.3	67.1	51.5	48.4	46.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.2	2.2								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	90		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	104	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.2	48	51.5	83.9
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-1.4	48	51.5	78.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.2			

Room Checksums

By HDR

119 COMM

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 6 / 11
Outside Air: OADB/WB/HR: 86 / 69 / 83

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	892	265	1,157	16
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	-10.16	-10.16	-0.14
Infiltration	0		0	0
Sub Total ==>	892	255	1,147	15
Internal Loads				
Lights	140	140	280	4
People	0	0	0	0
Misc	6,000	0	6,000	81
Sub Total ==>	6,140	140	6,280	84
Ceiling Load	395	-395	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			21	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	7,428	0	7,448	100.00

CLG SPACE PEAK

Mo/Hr: 6 / 11
OADB: 86

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	892	12
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	892	12
Internal Loads		
Lights	140	2
People	0	0
Misc	6,000	81
Sub Total ==>	6,140	83
Ceiling Load	395	5
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	7,428	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-360	-447	32.98
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-581.06	42.90
Infiltration	0	0	0.00
Sub Total ==>	-360	-1,028	75.88
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-413	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		-327	24.12
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-773	-1,354	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	70.0
Ra Plenum	85.4	56.1
Return	74.0	68.0
Ret/OA	74.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	354	354
Terminal	354	354
Main Fan	354	354
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	0	0
Return	354	354
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	3.22	3.22
cfm/ton	570.21	
ft²/ton	177.22	
Btu/hr·ft²	67.71	-7.03
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.6	7.5	7.5	354	74.1	56.6	41.4	55.0	48.6	41.1
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.6	7.5								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	110		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	126	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.8	354	68.0	70.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-0.8			

Room Checksums

By HDR

120 MECH/ELEC ROOM

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 17
Outside Air: OADB/WB/HR: 94 / 75 / 105

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	393	0	393	13
Glass Solar	0	0	0	0
Glass/Door Cond	115	0	115	4
Wall Cond	1,546	0	1,546	50
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	550		550	18
Sub Total ==>	2,603	0	2,603	85
Internal Loads				
Lights	459	0	459	15
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	459	0	459	15
Ceiling Load	0	0	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			9	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	3,062	0	3,071	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	393	14
Glass Solar	0	0
Glass/Door Cond	115	4
Wall Cond	1,546	56
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	244	9
Sub Total ==>	2,298	83
Internal Loads		
Lights	459	17
People	0	0
Misc	0	0
Sub Total ==>	459	17
Ceiling Load	0	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	2,757	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	-145	-145	8.58
Glass Solar	0	0	0.00
Glass/Door Cond	-228	-228	13.51
Wall Cond	-788	-788	46.67
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	0.00	0.00
Infiltration	-527	-527	31.24
Sub Total ==>	-1,688	-1,688	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	0	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,688	-1,688	100.00

TEMPERATURES

	Cooling	Heating
SADB	64.1	64.8
Ra Plenum	80.0	55.0
Return	80.0	55.0
Ret/OA	80.0	55.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	157	157
Terminal	157	157
Main Fan	157	157
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	16	16
MinStop/Rh	0	0
Return	173	173
Exhaust	16	16
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.87	0.87
cfm/ton	611.68	
ft²/ton	703.29	
Btu/hr·ft²	17.06	-9.38
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.3	3.1	2.8	157	80.1	66.6	77.5	64.1	60.7	74.8
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.3	3.1								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	180		
Part	0		
Int Door	0		
ExFlr	0		
Roof	180	0	0
Wall	297	0	0
Ext Door	21	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.7	157	55.0	64.8
Aux Htg	0.0	0	0.0	0.0
Preheat	-1.6	157	55.0	64.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-1.7			

Room Checksums

By HDR

ATTIC

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 16
Outside Air: OADB/WB/HR: 95 / 76 / 107

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	9,743	9,743	57
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	7,601	97	7,698	45
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	-258.51	0.00	-258.51	-1.50
Infiltration	0		0	0
Sub Total ==>	7,342	9,841	17,183	100
Internal Loads				
Lights	0	0	0	0
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	0	0	0	0
Ceiling Load	4,373	-4,373	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	11,715	5,468	17,183	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 94

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	8,820	73
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	-270.53	-2.23
Infiltration	0	0
Sub Total ==>	8,550	70
Internal Loads		
Lights	0	0
People	0	0
Misc	0	0
Sub Total ==>	0	0
Ceiling Load	3,608	30
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	12,158	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-3,645	-12.20
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-2,510	-2,549	-8.53
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	17,802.80	17,802.80	59.58
Infiltration	0	0	0.00
Sub Total ==>	15,293	11,609	38.85
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	5,452	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		9,135	30.57
System Plenum Heat		9,135	30.57
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	20,744	29,879	100.00

TEMPERATURES

	Cooling	Heating
SADB	85.0	85.0
Ra Plenum	87.9	48.7
Return	87.9	48.7
Ret/OA	89.0	45.3
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	0	0
Terminal	0	0
Main Fan	0	0
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	0	0
Return	0	0
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	14.5	14.5
cfm/ft²	0.00	0.00
cfm/ton	0.00	
ft²/ton	0.00	
Btu/hr·ft²	0.00	0.00
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	4,710		
Part	0		
Int Door	0		
ExFlr	4,723		
Roof	4,745	0	0
Wall	1,152	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	0.0	0	57.0	85.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	45.3	84.7
Reheat	0.0	0	57.0	85.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	0.0			

Room Checksums

By HDR

HALLWAY

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 96 / 77 / 111

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	291	0	291	2
Glass/Door Cond	452	0	452	3
Wall Cond	1,520	501	2,021	12
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	474.64	474.64	2.80
Infiltration	1,578		1,578	9
Sub Total ==>	3,842	976	4,817	28
Internal Loads				
Lights	735	735	1,469	9
People	0	0	0	0
Misc	0	0	0	0
Sub Total ==>	735	735	1,469	9
Ceiling Load	1,579	-1,579	0	0
Ventilation Load	0	0	4,794	28
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			2,520	15
Ov/Undr Sizing	3,200		3,200	19
Exhaust Heat		0	0	0
Sup. Fan Heat			129	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	9,355	131	16,928	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 11
OADB: 88

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	499	5
Glass/Door Cond	257	3
Wall Cond	2,437	27
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	413	5
Sub Total ==>	3,605	39
Internal Loads		
Lights	787	9
People	0	0
Misc	0	0
Sub Total ==>	787	9
Ceiling Load	1,571	17
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	3,200	35
Grand Total ==>	9,163	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 25

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-860	-860	4.95
Wall Cond	-1,212	-1,562	8.98
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	-3,396.08	19.53
Infiltration	-1,308	-1,308	7.52
Sub Total ==>	-3,381	-7,126	40.99
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-2,155	0	0.00
Ventilation Load	0	-3,973	22.85
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		-4,481	25.77
System Plenum Heat		-1,806	10.39
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-5,536	-17,387	100.00

TEMPERATURES

	Cooling	Heating
SADB	54.9	79.5
Ra Plenum	82.1	56.9
Return	74.0	68.0
Ret/OA	78.3	59.7
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	434	434
Terminal	434	434
Main Fan	434	434
Sec Fan	0	0
Nom Vent	84	84
AHU Vent	84	84
Infil	28	28
MinStop/Rh	434	434
Return	462	462
Exhaust	112	112
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	19.3	19.3
cfm/ft²	0.71	0.71
cfm/ton	280.10	
ft²/ton	396.57	
Btu/hr·ft²	30.26	-28.44
No. People	0.0	0.0/1000 ft²

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	1.6	18.6	12.1	434	78.3	65.1	72.6	50.4	50.3	54.7
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	1.6	18.6								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	615		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	462	20	4
Ext Door	33	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-17.5	434	50.4	79.5
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-11.3	434	50.4	74.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-17.5			

SYSTEM SUMMARY

DESIGN AIRFLOW QUANTITIES

By HDR

System Description	System Type	MAIN SYSTEM Outside Airflow cfm	Cooling Airflow cfm	Heating Airflow cfm	Return Airflow cfm	Exhaust Airflow cfm	Auxiliary System Supply Airflow cfm	Room Exhaust Airflow cfm
Alternative 1								
SS-1	Incremental Heat Pump	0	157	157	173	16	0	0
SS-2	Incremental Heat Pump	0	354	354	354	0	0	0
HEAT PUMPS	Incremental Heat Pump	1,090	3,985	3,985	5,141	1,156	0	0
UH-1	Unit Heaters	0	0	32	0	4	0	0
UH-2	Unit Heaters	0	0	33	0	5	0	0
Totals		**1,090**	**4,495**	**4,561**	**5,667**	**1,182**	**0**	**0**
Alternative 2								
VRF	Variable Refrigerant Flow	1,090	3,864	3,864	5,037	1,172	0	0
UH-1	Unit Heaters	0	0	32	0	4	0	0
UH-2	Unit Heaters	0	0	33	0	5	0	0
Totals		**1,090**	**3,864**	**3,930**	**5,037**	**1,182**	**0**	**0**
Alternative 3								
SS-2	Incremental Heat Pump	0	354	354	354	0	0	0
AHU - OFFICE	Variable Volume Reheat (30% Min Flow Default)	652	4,332	1,640	4,398	719	0	0
SS-1	Incremental Heat Pump	0	157	157	173	16	0	0
UH-1	Unit Heaters	0	0	32	0	4	0	0
UH-2	Unit Heaters	0	0	33	0	5	0	0
Totals		**652**	**4,842**	**2,216**	**4,924**	**744**	**0**	**0**
Alternative 4								
SS-1	Incremental Heat Pump	0	157	157	173	16	0	0
SS-2	Incremental Heat Pump	0	354	354	354	0	0	0
RTU-1	System 3 - 2007/2010 - Packaged Rooftop Air Conditio	311	1,609	1,609	1,675	378	0	0
RTU-2	System 3 - 2007/2010 - Packaged Rooftop Air Conditio	300	2,075	2,075	2,075	300	0	0
UH-1	Unit Heaters	0	0	32	0	4	0	0
UH-2	Unit Heaters	0	0	33	0	5	0	0
Totals		**611**	**4,194**	**4,260**	**4,277**	**703**	**0**	**0**

Note: Airflows on this report are not additive because they are each taken at the time of their respective peaks. To view the balanced system design airflows, see the appropriate Checksums report (Airflows section).

Load / Airflow Summary

By HDR

System	Zone	Room **		Floor Area ft²	People #	Coil Cooling Sensible Btu/h	Coil Cooling Total Btu/h	Space Design Max SA cfm	Air Changes ach/hr	VAV Minimum SA cfm	VAV Minimum %	Main Coil Heating Sensible Btu/h	Heating Fan Max SA cfm	Percent OA Clg	Percent OA Htg
Alternative 1															
	ATTIC		Rm Peak	4,710	0.0	0	0	0	0.00	0	0	0	0	0.0	0.0
		101 LOBBY	Rm Peak	860	12.0	14,230	16,168	835	6.47	0	0	-7,595	835	28.8	28.8
		102 WOMENS RR	Rm Peak	70	0.0	1,282	1,282	55	5.21	0	0	-656	55	0.0	0.0
		103 MENS RR	Rm Peak	65	0.0	240	240	16	1.60	0	0	-338	16	0.0	0.0
		104 WOMENS RR	Rm Peak	68	0.0	1,304	1,304	55	5.42	0	0	-652	55	0.0	0.0
		105 MENS RR	Rm Peak	62	0.0	229	229	15	1.60	0	0	-323	15	0.0	0.0
	Zone - 001A		Zn Peak	1,125	12.0	17,284	19,223	975			0	-9,564	975	24.6	24.6
	Zone - 001A		Zn Block	1,125	12.0	16,540	18,478	975			0	-9,564	975	24.6	24.6
		107 JANITORS	Rm Peak	65	0.0	240	240	16	1.60	0	0	-338	16	0.0	0.0
		108 STORAGE	Rm Peak	85	0.0	-124	-756	14	1.07	0	0	-332	14	365.9	365.9
		HALLWAY	Rm Peak	615	0.0	6,295	6,618	447	4.84	0	0	-6,472	447	11.2	11.2
	Zone - 002A		Zn Peak	765	0.0	6,411	6,102	476			0	-7,142	476	21.0	21.0
	Zone - 002A		Zn Block	765	0.0	6,506	6,195	476			0	-7,142	476	21.0	21.0
		106 VCC OFFICE	Rm Peak	415	2.0	3,161	3,533	194	3.11	0	0	-2,050	194	25.8	25.8
	Zone - 002B		Zn Peak	415	2.0	3,161	3,533	194			0	-2,050	194	25.8	25.8
	Zone - 002B		Zn Block	415	2.0	3,161	3,533	194			0	-2,050	194	25.8	25.8
		114 BREAKROOM	Rm Peak	250	1.7	2,641	2,962	151	4.03	0	0	-1,191	151	33.1	33.1
	Zone - 002C		Zn Peak	250	1.7	2,641	2,962	151			0	-1,191	151	33.1	33.1
	Zone - 002C		Zn Block	250	1.7	2,641	2,962	151			0	-1,191	151	33.1	33.1
		113 CONFERENCE/TRAINING	Rm Peak	350	14.0	4,932	5,895	290	5.52	0	0	-1,203	290	96.7	96.7
	Zone - 003A		Zn Peak	350	14.0	4,932	5,895	290			0	-1,203	290	96.7	96.7
	Zone - 003A		Zn Block	350	14.0	4,932	5,895	290			0	-1,203	290	96.7	96.7
		110 MMT CARRIER	Rm Peak	230	2.0	4,520	5,028	217	6.28	0	0	-1,714	217	23.1	23.1
	Zone - 004A		Zn Peak	230	2.0	4,520	5,028	217			0	-1,714	217	23.1	23.1
	Zone - 004A		Zn Block	230	2.0	4,520	5,028	217			0	-1,714	217	23.1	23.1
		111 TRAF CHECK IN	Rm Peak	160	1.0	1,070	1,301	68	2.82	0	0	-722	68	74.0	74.0
		112 OPEN OFFICE	Rm Peak	740	6.0	16,369	16,773	1,152	10.38	0	0	-6,237	1,152	10.4	10.4
	Zone - 004B		Zn Peak	900	7.0	17,438	18,074	1,220			0	-6,960	1,220	13.9	13.9
	Zone - 004B		Zn Block	900	7.0	17,435	18,066	1,220			0	-6,959	1,220	13.9	13.9
		116 SR TRAFFIC OFFICE	Rm Peak	173	1.0	4,042	4,347	189	7.27	0	0	-1,616	189	26.5	26.5
		117 SR TRAFFIC OFFICE	Rm Peak	195	1.0	5,478	5,792	247	8.44	0	0	-2,197	247	20.3	20.3
		118 FILE ROOM	Rm Peak	90	0.0	830	979	28	2.05	0	0	-656	28	180.9	180.9
	Zone - 005A		Zn Peak	458	2.0	10,351	11,118	463			0	-4,470	463	32.4	32.4
	Zone - 005A		Zn Block	458	2.0	9,938	10,707	463			0	-4,470	463	32.4	32.4
HEAT PUMPS			**Sys Peak**	**9,203**	**40.7**	**66,738**	**71,935**	**3,985**				**-34,294**	**3,985**	**27.4**	**27.4**

*** This report does not display heating only systems.**

System	Zone	Room **		Floor Area ft²	People #	Coil Cooling Sensible Btu/h	Coil Cooling Total Btu/h	Space Design Max SA cfm	Air Changes ach/hr	VAV Minimum SA cfm	VAV Minimum %	Main Coil Heating Sensible Btu/h	Heating Fan Max SA cfm	Percent OA Clg	Percent OA Htg
HEAT PUMPS			**Sys Block**	**9,203**	**40.7**	**75,152**	**80,490**	**3,985**				**-26,996**	**3,985**	**27.4**	**27.4**
		120 MECH/ELEC ROOM	Rm Peak	180	0.0	2,766	3,071	157	2.93	0	0	-1,688	157	0.0	0.0
	Zone - 006A		Zn Peak	180	0.0	2,766	3,071	157			0	-1,688	157	0.0	0.0
	Zone - 006A		Zn Block	180	0.0	2,766	3,071	157			0	-1,688	157	0.0	0.0
SS-1			**Sys Peak**	**180**	**0.0**	**2,766**	**3,071**	**157**				**-1,688**	**157**	**0.0**	**0.0**
SS-1			**Sys Block**	**180**	**0.0**	**2,766**	**3,071**	**157**				**-1,688**	**157**	**0.0**	**0.0**
		119 COMM	Rm Peak	110	0.0	7,448	7,448	354	21.45	0	0	-773	354	0.0	0.0
	Zone - 007A		Zn Peak	110	0.0	7,448	7,448	354			0	-773	354	0.0	0.0
	Zone - 007A		Zn Block	110	0.0	7,448	7,448	354			0	-773	354	0.0	0.0
SS-2			**Sys Peak**	**110**	**0.0**	**7,448**	**7,448**	**354**				**-773**	**354**	**0.0**	**0.0**
SS-2			**Sys Block**	**110**	**0.0**	**7,448**	**7,448**	**354**				**-773**	**354**	**0.0**	**0.0**

*** This report does not display heating only systems.**

System	Zone	Room **		Floor Area ft²	People #	Coil Cooling Sensible Btu/h	Coil Cooling Total Btu/h	Space Design Max SA cfm	Air Changes ach/hr	VAV Minimum SA cfm	VAV Minimum %	Main Coil Heating Sensible Btu/h	Heating Fan Max SA cfm	Percent OA Clg	Percent OA Htg
Alternative 2															
	ATTIC		Rm Peak	4,710	0.0	0	0	0	0.00	0	0	0	0	0.0	0.0
		101 LOBBY	Rm Peak	860	12.0	13,268	15,232	805	6.24	81	10	-14,606	725	29.8	29.8
		102 WOMENS RR	Rm Peak	70	0.0	1,286	1,286	65	6.19	6	10	-1,179	58	0.0	0.0
		103 MENS RR	Rm Peak	65	0.0	243	243	18	1.90	2	10	-335	17	0.0	0.0
		104 WOMENS RR	Rm Peak	68	0.0	1,307	1,307	66	6.43	7	10	-1,190	59	0.0	0.0
		105 MENS RR	Rm Peak	62	0.0	232	232	18	1.90	2	10	-320	16	0.0	0.0
	Zone - 001A		Zn Peak	1,125	12.0	16,336	18,301	972			10	-17,631	875	24.7	24.7
	Zone - 001A		Zn Block	1,125	12.0	15,587	17,552	972			10	-17,631	875	24.7	24.7
		107 JANITORS	Rm Peak	65	0.0	242	242	16	1.60	2	10	-378	14	0.0	0.0
		108 STORAGE	Rm Peak	85	0.0	266	246	14	1.06	1	10	-328	12	370.1	370.1
		HALLWAY	Rm Peak	615	0.0	5,939	6,740	309	3.35	31	10	-7,499	278	16.2	16.2
	Zone - 002A		Zn Peak	765	0.0	6,448	7,228	338			10	-8,205	304	29.6	29.6
	Zone - 002A		Zn Block	765	0.0	6,168	6,947	338			10	-8,205	304	29.6	29.6
		106 VCC OFFICE	Rm Peak	415	2.0	3,168	3,542	193	3.11	19	10	-2,031	174	25.9	25.9
	Zone - 002B		Zn Peak	415	2.0	3,168	3,542	193			10	-2,031	174	25.9	25.9
	Zone - 002B		Zn Block	415	2.0	3,168	3,542	193			10	-2,031	174	25.9	25.9
		114 BREAKROOM	Rm Peak	250	1.7	2,645	2,970	151	4.03	15	10	-1,180	136	33.1	33.1
	Zone - 002C		Zn Peak	250	1.7	2,645	2,970	151			10	-1,180	136	33.1	33.1
	Zone - 002C		Zn Block	250	1.7	2,645	2,970	151			10	-1,180	136	33.1	33.1
		113 CONFERENCE/TRAINING	Rm Peak	350	14.0	4,938	5,918	289	5.51	29	10	-1,188	260	96.8	96.8
	Zone - 003A		Zn Peak	350	14.0	4,938	5,918	289			10	-1,188	260	96.8	96.8
	Zone - 003A		Zn Block	350	14.0	4,938	5,918	289			10	-1,188	260	96.8	96.8
		110 MMT CARRIER	Rm Peak	230	2.0	4,523	5,030	216	6.27	22	10	-1,704	195	23.1	23.1
	Zone - 004A		Zn Peak	230	2.0	4,523	5,030	216			10	-1,704	195	23.1	23.1
	Zone - 004A		Zn Block	230	2.0	4,523	5,030	216			10	-1,704	195	23.1	23.1
		111 TRAF CHECK IN	Rm Peak	160	1.0	1,021	1,238	68	2.81	7	10	-715	61	74.0	74.0
		112 OPEN OFFICE	Rm Peak	740	6.0	14,915	16,148	713	6.43	71	10	-7,557	642	16.8	16.8
	Zone - 004B		Zn Peak	900	7.0	15,935	17,386	781			10	-8,272	703	21.8	21.8
	Zone - 004B		Zn Block	900	7.0	15,984	17,431	781			10	-8,272	703	21.8	21.8
		116 SR TRAFFIC OFFICE	Rm Peak	173	1.0	3,572	3,867	167	6.44	17	10	-3,945	150	29.9	29.9
		117 SR TRAFFIC OFFICE	Rm Peak	195	1.0	4,928	5,225	221	7.55	22	10	-5,213	199	22.7	22.7
		118 FILE ROOM	Rm Peak	90	0.0	831	930	28	2.05	3	10	-652	25	181.1	181.1
	Zone - 005A		Zn Peak	458	2.0	9,331	10,022	415			10	-9,810	374	36.1	36.1
	Zone - 005A		Zn Block	458	2.0	8,995	9,687	415			10	-9,810	374	36.1	36.1
		120 MECH/ELEC ROOM	Rm Peak	180	0.0	2,772	3,082	155	2.89	15	10	-1,723	139	0.0	0.0
	Zone - 006A		Zn Peak	180	0.0	2,772	3,082	155			10	-1,723	139	0.0	0.0
	Zone - 006A		Zn Block	180	0.0	2,772	3,082	155			10	-1,723	139	0.0	0.0
		119 COMM	Rm Peak	110	0.0	7,535	7,535	354	21.44	35	10	-928	318	0.0	0.0
	Zone - 007A		Zn Peak	110	0.0	7,535	7,535	354			10	-928	318	0.0	0.0
	Zone - 007A		Zn Block	110	0.0	7,535	7,535	354			10	-928	318	0.0	0.0

*** This report does not display heating only systems.**

System	Zone	Room **		Floor Area ft²	People #	Coil Cooling Sensible Btu/h	Coil Cooling Total Btu/h	Space Design Max SA cfm	Air Changes ach/hr	VAV Minimum SA cfm	VAV Minimum %	Main Coil Heating Sensible Btu/h	Heating Fan Max SA cfm	Percent OA Clg	Percent OA Htg
VRF			Sys Peak	9,493	40.7	73,631	81,014	3,864				-52,672	3,478	28.2	28.2
VRF			Sys Block	9,493	40.7	82,808	90,332	3,864				-37,339	3,478	28.2	28.2

*** This report does not display heating only systems.**

System	Zone	Room **		Floor Area ft²	People #	Coil Cooling Sensible Btu/h	Coil Cooling Total Btu/h	Space Design Max SA cfm	Air Changes ach/hr	VAV Minimum SA cfm	VAV Minimum %	Main Coil Heating Sensible Btu/h	Heating Fan Max SA cfm	Percent OA Clg	Percent OA Htg
Alternative 3															
	ATTIC		Rm Peak	4,710	0.0	0	0	0	0.00	0	0	0	0	12.7	0.0
		101 LOBBY	Rm Peak	860	12.0	18,657	26,140	1,109	8.59	333	30	-12,375	0	12.7	39.8
		102 WOMENS RR	Rm Peak	70	0.0	1,565	1,826	89	8.52	27	30	-999	0	12.7	39.8
		103 MENS RR	Rm Peak	65	0.0	323	511	46	4.71	14	30	-513	0	12.7	39.8
		104 WOMENS RR	Rm Peak	68	0.0	1,587	1,846	89	8.72	27	30	-993	0	12.7	39.8
		105 MENS RR	Rm Peak	62	0.0	324	503	44	4.71	13	30	-489	0	12.7	39.8
	Zone - 001A		Zn Peak	1,125	12.0	24,306	32,676	1,377			30	-15,369	0	15.7	39.8
	Zone - 001A		Zn Block	1,125	12.0	23,939	32,386	1,109			37	-15,369	0	15.7	39.8
		107 JANITORS	Rm Peak	65	0.0	323	511	46	4.71	14	30	-513	0	12.7	39.8
		108 STORAGE	Rm Peak	85	0.0	368	431	21	1.67	21	100	-713	0	12.7	39.8
		HALLWAY	Rm Peak	615	0.0	8,699	12,578	899	9.74	270	30	-10,032	0	12.7	39.8
	Zone - 002A		Zn Peak	765	0.0	17,636	21,766	966			32	-11,257	0	13.6	39.8
	Zone - 002A		Zn Block	765	0.0	18,820	22,932	899			34	-11,257	0	13.6	39.8
		106 VCC OFFICE	Rm Peak	415	2.0	4,384	5,984	293	4.71	88	30	-3,276	0	12.7	39.8
	Zone - 002B		Zn Peak	415	2.0	4,384	5,984	293			30	-3,276	0	12.7	39.8
	Zone - 002B		Zn Block	415	2.0	4,384	5,984	293			30	-3,276	0	12.7	39.8
		114 BREAKROOM	Rm Peak	250	1.7	3,439	4,570	191	5.10	57	30	-2,030	0	12.7	39.8
	Zone - 002C		Zn Peak	250	1.7	3,439	4,570	191			30	-2,030	0	12.7	39.8
	Zone - 002C		Zn Block	250	1.7	3,439	4,570	191			30	-2,030	0	12.7	39.8
		113 CONFERENCE/TRAINING	Rm Peak	350	14.0	7,201	11,383	365	6.96	190	52	-4,252	0	12.7	39.8
	Zone - 003A		Zn Peak	350	14.0	7,201	11,383	365			52	-4,252	0	12.7	39.8
	Zone - 003A		Zn Block	350	14.0	7,201	11,383	365			52	-4,252	0	12.7	39.8
		110 MMT CARRIER	Rm Peak	230	2.0	5,669	7,064	277	8.02	83	30	-2,885	0	12.7	39.8
	Zone - 004A		Zn Peak	230	2.0	5,669	7,064	277			30	-2,885	0	12.7	39.8
	Zone - 004A		Zn Block	230	2.0	5,669	7,064	277			30	-2,885	0	12.7	39.8
		111 TRAF CHECK IN	Rm Peak	160	1.0	1,566	2,229	113	4.71	34	30	-1,263	0	12.7	39.8
		112 OPEN OFFICE	Rm Peak	740	6.0	18,386	22,512	912	8.21	274	30	-9,996	0	12.7	39.8
	Zone - 004B		Zn Peak	900	7.0	19,804	24,592	1,025			30	-11,259	0	13.0	39.8
	Zone - 004B		Zn Block	900	7.0	19,948	24,627	998			31	-11,259	0	13.0	39.8
		116 SR TRAFFIC OFFICE	Rm Peak	173	1.0	4,477	5,368	236	9.08	71	30	-2,631	0	12.7	39.8
		117 SR TRAFFIC OFFICE	Rm Peak	195	1.0	6,144	7,398	315	10.78	95	30	-3,518	0	12.7	39.8
		118 FILE ROOM	Rm Peak	90	0.0	1,399	1,704	105	7.74	31	30	-1,167	0	12.7	39.8
	Zone - 005A		Zn Peak	458	2.0	12,351	14,802	655			30	-7,316	0	16.3	39.8
	Zone - 005A		Zn Block	458	2.0	11,853	14,449	509			39	-7,316	0	16.3	39.8
AHU - OFFICE			**Sys Peak**	**9,203**	**40.7**	**83,226**	**111,272**	**5,150**				**-57,644**	**0**	**15.1**	**39.8**
AHU - OFFICE			**Sys Block**	**9,203**	**40.7**	**93,051**	**122,649**	**4,332**				**-50,104**	**0**	**15.1**	**39.8**
		120 MECH/ELEC ROOM	Rm Peak	180	0.0	2,766	3,071	157	2.93	0	0	-1,688	157	0.0	0.0
	Zone - 006A		Zn Peak	180	0.0	2,766	3,071	157			0	-1,688	157	0.0	0.0
	Zone - 006A		Zn Block	180	0.0	2,766	3,071	157			0	-1,688	157	0.0	0.0
SS-1			**Sys Peak**	**180**	**0.0**	**2,766**	**3,071**	**157**				**-1,688**	**157**	**0.0**	**0.0**

*** This report does not display heating only systems.**

System	Zone Room **		Floor Area ft²	People #	Coil Cooling Sensible Btu/h	Coil Cooling Total Btu/h	Space Design Max SA cfm	Air Changes ach/hr	VAV Minimum SA cfm	VAV Minimum %	Main Coil Heating Sensible Btu/h	Heating Fan Max SA cfm	Percent OA Clg	Percent OA Htg
SS-1		**Sys Block**	**180**	**0.0**	**2,766**	**3,071**	**157**				**-1,688**	**157**	**0.0**	**0.0**
	119 COMM	Rm Peak	110	0.0	7,448	7,448	354	21.45	0	0	-758	354	0.0	0.0
	Zone - 007A	Zn Peak	110	0.0	7,448	7,448	354			0	-758	354	0.0	0.0
	Zone - 007A	Zn Block	110	0.0	7,448	7,448	354			0	-758	354	0.0	0.0
SS-2		**Sys Peak**	**110**	**0.0**	**7,448**	**7,448**	**354**				**-758**	**354**	**0.0**	**0.0**
SS-2		**Sys Block**	**110**	**0.0**	**7,448**	**7,448**	**354**				**-471**	**354**	**0.0**	**0.0**
Alternative 4														
	101 LOBBY	Rm Peak	860	12.0	20,070	34,168	666	5.16	666	100	-21,459	0	19.3	19.3
	102 WOMENS RR	Rm Peak	70	0.0	1,543	2,308	53	5.03	53	100	-1,701	0	19.3	19.3
	103 MENS RR	Rm Peak	65	0.0	458	677	18	1.83	18	100	-576	0	19.3	19.3
	104 WOMENS RR	Rm Peak	68	0.0	1,562	2,337	53	5.24	53	100	-1,721	0	19.3	19.3
	105 MENS RR	Rm Peak	62	0.0	437	646	17	1.83	17	100	-549	0	19.3	19.3
	106 VCC OFFICE	Rm Peak	415	2.0	5,031	8,211	180	2.90	180	100	-5,809	0	19.3	19.3
	107 JANITORS	Rm Peak	65	0.0	458	677	18	1.83	18	100	-576	0	19.3	19.3
	108 STORAGE	Rm Peak	85	0.0	820	1,132	23	1.83	23	100	-753	0	19.3	19.3
	114 BREAKROOM	Rm Peak	250	1.7	4,121	6,737	146	3.88	146	100	-4,688	0	19.3	19.3
	HALLWAY	Rm Peak	615	0.0	12,048	18,609	434	4.71	434	100	-13,991	0	19.3	19.3
RTU-1		**Sys Peak**	**2,555**	**15.7**	**46,546**	**75,504**	**1,609**				**-51,822**	**0**	**19.3**	**19.3**
RTU-1		**Sys Block**	**2,555**	**15.7**	**44,692**	**73,931**	**1,609**				**-50,580**	**0**	**19.3**	**19.3**
	110 MMT CARRIER	Rm Peak	230	2.0	6,994	11,116	261	7.56	261	100	-9,339	0	14.5	14.5
	111 TRAF CHECK IN	Rm Peak	160	1.0	1,975	3,376	87	3.61	87	100	-3,107	0	14.5	14.5
	112 OPEN OFFICE	Rm Peak	740	6.0	21,139	34,924	865	7.79	865	100	-30,968	0	14.5	14.5
	113 CONFERENCE/TRAINING	Rm Peak	350	14.0	8,898	17,025	347	6.61	347	100	-12,435	0	14.5	14.5
	116 SR TRAFFIC OFFICE	Rm Peak	173	1.0	4,898	8,068	207	7.96	207	100	-7,399	0	14.5	14.5
	117 SR TRAFFIC OFFICE	Rm Peak	195	1.0	7,413	11,139	261	8.92	261	100	-9,344	0	14.5	14.5
	118 FILE ROOM	Rm Peak	90	0.0	1,544	2,208	48	3.59	48	100	-1,735	0	14.5	14.5
	ATTIC	Rm Peak	4,710	0.0	0	0	0	0.00	0	0	0	0	14.5	14.5
RTU-2		**Sys Peak**	**6,648**	**25.0**	**52,860**	**87,856**	**2,075**				**-74,326**	**0**	**14.5**	**14.5**
RTU-2		**Sys Block**	**6,648**	**25.0**	**67,547**	**104,749**	**2,075**				**-74,483**	**0**	**14.5**	**14.5**
	120 MECH/ELEC ROOM	Rm Peak	180	0.0	2,766	3,071	157	2.93	0	0	-1,688	157	0.0	0.0
SS-1		**Sys Peak**	**180**	**0.0**	**2,766**	**3,071**	**157**				**-1,688**	**157**	**0.0**	**0.0**
SS-1		**Sys Block**	**180**	**0.0**	**2,766**	**3,071**	**157**				**-1,688**	**157**	**0.0**	**0.0**
	119 COMM	Rm Peak	110	0.0	7,448	7,448	354	21.45	0	0	-773	354	0.0	0.0
SS-2		**Sys Peak**	**110**	**0.0**	**7,448**	**7,448**	**354**				**-773**	**354**	**0.0**	**0.0**
SS-2		**Sys Block**	**110**	**0.0**	**7,448**	**7,448**	**354**				**-773**	**354**	**0.0**	**0.0**

*** This report does not display heating only systems.**

Appendix C

Life Cycle Cost Analyses

September 6, 2024

NIST BLCC 5.3-22: Lowest LCC

Consistent with Federal Life Cycle Cost Methodology and Procedures, 10 CFR, Part 436, Subpart A

General Information

File Name:	C:\Users\chaby\Desktop\LCCA\Pine Bluff\Pine Bluff Arsenal ACP.XML
Date of Study:	Wed Sep 25 16:00:50 CDT 2024
Analysis Type:	FEMP Analysis, Energy Project
Project Name:	PBA ACP
Project Location:	Arkansas
Analyst:	CH
Comment:	ALT 1: Heat Pumps with DOAS ALT 2: VRF with DOAS ALT 3: DX VAV AHU ALT 4: ASHRAE 90.1 BASELINE
Base Date:	January 1, 2025
Service Date:	January 1, 2027
Study Period:	42 years 0 months (January 1, 2025 through December 31, 2066)
Discount Rate:	3%
Discounting Convention:	Mid-Year

Lowest LCC

Comparative Present-Value Costs of Alternatives
(Shown in Ascending Order of Initial Cost, * = Lowest LCC)

Alternative	Initial Cost (PV)	Life Cycle Cost (PV)	
ALT 4: ASHRAE 90.1 BASELINE	$0	$137,226	*
ALT 1: Heat Pumps with DOAS	$104,860	$682,698	
ALT 2: VRF with DOAS	$129,030	$822,242	
ALT 3: DX VAV AHU	$143,966	$747,129	

NIST BLCC 5.3-22: Summary LCC

Consistent with Federal Life Cycle Cost Methodology and Procedures, 10 CFR, Part 436, Subpart A

General Information

File Name:	C:\Users\chaby\Desktop\LCCA\Pine Bluff\Pine Bluff Arsenal ACP.XML
Date of Study:	Wed Sep 25 16:01:08 CDT 2024
Analysis Type:	FEMP Analysis, Energy Project
Project Name:	PBA ACP
Project Location:	Arkansas
Analyst:	CH
Comment:	ALT 1: Heat Pumps with DOAS ALT 2: VRF with DOAS ALT 3: DX VAV AHU ALT 4: ASHRAE 90.1 BASELINE
Base Date:	January 1, 2025
Service Date:	January 1, 2027
Study Period:	42 years 0 months (January 1, 2025 through December 31, 2066)
Discount Rate:	3%
Discounting Convention:	Mid-Year

Discount and Escalation Rates are REAL (exclusive of general inflation)

Alternative: ALT 1: Heat Pumps with DOAS

LCC Summary

	Present Value	Annual Value
Initial Cost	$104,860	$4,424
Energy Consumption Costs	$126,992	$5,358
Energy Demand Costs	$0	$0
Energy Utility Rebates	$0	$0
Water Usage Costs	$0	$0
Water Disposal Costs	$0	$0
Annually Recurring OM&R Costs	$193,524	$8,165
Non-Annually Recurring OM&R Costs	$0	$0
Replacement Costs	$389,654	$16,441
Less Remaining Value	-$132,333	-$5,584
Total Life-Cycle Cost	$682,698	$28,806

Alternative: ALT 2: VRF with DOAS

LCC Summary

	Present Value	Annual Value
Initial Cost	$129,030	$5,444

Energy Consumption Costs	$104,496	$4,409
Energy Demand Costs	$0	$0
Energy Utility Rebates	$0	$0
Water Usage Costs	$0	$0
Water Disposal Costs	$0	$0
Annually Recurring OM&R Costs	$285,632	$12,052
Non-Annually Recurring OM&R Costs	$0	$0
Replacement Costs	$435,393	$18,371
Less Remaining Value	-$132,308	-$5,583
Total Life-Cycle Cost	$822,242	$34,693

Alternative: ALT 3: DX VAV AHU

LCC Summary

	Present Value	Annual Value
Initial Cost	$143,966	$6,074
Energy Consumption Costs	$102,045	$4,306
Energy Demand Costs	$0	$0
Energy Utility Rebates	$0	$0
Water Usage Costs	$0	$0
Water Disposal Costs	$0	$0
Annually Recurring OM&R Costs	$178,649	$7,538
Non-Annually Recurring OM&R Costs	$0	$0
Replacement Costs	$452,773	$19,104
Less Remaining Value	-$130,304	-$5,498
Total Life-Cycle Cost	$747,129	$31,524

Alternative: ALT 4: ASHRAE 90.1 BASELINE

LCC Summary

	Present Value	Annual Value
Initial Cost	$0	$0
Energy Consumption Costs	$137,226	$5,790
Energy Demand Costs	$0	$0
Energy Utility Rebates	$0	$0
Water Usage Costs	$0	$0
Water Disposal Costs	$0	$0

Annually Recurring OM&R Costs	$0	$0
Non-Annually Recurring OM&R Costs	$0	$0
Replacement Costs	$0	$0
Less Remaining Value	$0	$0
Total Life-Cycle Cost	$137,226	$5,790

NIST BLCC 5.3-22: Detailed LCC Analysis

Consistent with Federal Life Cycle Cost Methodology and Procedures, 10 CFR, Part 436, Subpart A

General Information

File Name:	C:\Users\chaby\Desktop\LCCA\Pine Bluff\Pine Bluff Arsenal ACP.XML
Date of Study:	Wed Sep 25 16:01:26 CDT 2024
Analysis Type:	FEMP Analysis, Energy Project
Project Name:	PBA ACP
Project Location:	Arkansas
Analyst:	CH
Comment:	ALT 1: Heat Pumps with DOAS ALT 2: VRF with DOAS ALT 3: DX VAV AHU ALT 4: ASHRAE 90.1 BASELINE
Base Date:	January 1, 2025
Service Date:	January 1, 2027
Study Period:	42 years 0 months (January 1, 2025 through December 31, 2066)
Discount Rate:	3%
Discounting Convention:	Mid-Year

Discount and Escalation Rates are REAL (exclusive of general inflation)

Alternative: ALT 1: Heat Pumps with DOAS

Initial Cost Data (not Discounted)

Initial Capital Costs

(adjusted for price escalation)

Initial Capital Costs for All Components: $104,860

Component: Heat Pump 0.5-ton - Ducted
Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2025	100%	$12,000
Total (for Component)		$12,000

Component: Heat Pump 1-ton - Ducted
Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2025	100%	$13,400
Total (for Component)		$13,400

Component: Heat Pump 1.5-ton - Ducted
Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2025	100%	$7,500
Total (for Component)		$7,500

Component: Heat Pump 0.5-ton - Ceiling
Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2025	100%	$15,000
Total (for Component)		$15,000

Component: DX DOAS - 1100 CFM
Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2025	100%	$24,000
Total (for Component)		$24,000

Component: Split System 0.5-ton - Wall
Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2025	100%	$5,000
Total (for Component)		$5,000

Component: Ductwork (Supply/Return) - 10.00 per LB
Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2025	100%	$10,020
Total (for Component)		$10,020

Component: Refrigerant Piping - Line Sets 50'
Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2025	100%	$6,240
Total (for Component)		$6,240

Component: Refrigerant Piping - Line Sets 100'

Component: Refrigerant Piping - Line Sets 100
Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2025	100%	$2,700
Total (for Component)		$2,700

Component: Ductwork Insulation - 2
Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2025	100%	$4,000
Total (for Component)		$4,000

Component: Controls
Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2025	100%	$5,000
Total (for Component)		$5,000

Energy Costs: Electricity
(base-year dollars)

Average Annual Usage	Average Price/Unit	Average Annual Cost	Average Annual Demand	Average Annual Rebate
228.9 MBtu	$26.37630	$6,037	$0	$0

Life-Cycle Cost Analysis

	Present Value	Annual Value
Initial Capital Costs	$104,860	$4,424
Energy Costs		
Energy Consumption Costs	$126,992	$5,358
Energy Demand Charges	$0	$0
Energy Utility Rebates	$0	$0
Subtotal (for Energy):	$126,992	$5,358
Water Usage Costs	$0	$0
Water Disposal Costs	$0	$0

Operating, Maintenance & Repair Costs

Component: Heat Pump 0.5-ton - Ducted		
Annually Recurring Costs	$28,593	$1,206
Non-Annually Recurring Costs	$0	$0
Component: Heat Pump 1-ton - Ducted		
Annually Recurring Costs	$31,928	$1,347
Non-Annually Recurring Costs	$0	$0
Component: Heat Pump 1.5-ton - Ducted		
Annually Recurring Costs	$17,870	$754
Non-Annually Recurring Costs	$0	$0
Component: Heat Pump 0.5-ton - Ceiling		
Annually Recurring Costs	$23,827	$1,005
Non-Annually Recurring Costs	$0	$0
Component: DX DOAS - 1100 CFM		
Annually Recurring Costs	$57,185	$2,413
Non-Annually Recurring Costs	$0	$0
Component: Split System 0.5-ton - Wall		
Annually Recurring Costs	$7,942	$335
Non-Annually Recurring Costs	$0	$0
Component: Ductwork (Supply/Return) - 10.00 per LB		
Annually Recurring Costs	$7,958	$336
Non-Annually Recurring Costs	$0	$0
Component: Refrigerant Piping - Line Sets 50'		
Annually Recurring Costs	$4,956	$209
Non-Annually Recurring Costs	$0	$0
Component: Refrigerant Piping - Line Sets 100'		
Annually Recurring Costs	$2,144	$90
Non-Annually Recurring Costs	$0	$0
Component: Ductwork Insulation - 2		
Annually Recurring Costs	$3,177	$134
Non-Annually Recurring Costs	$0	$0
Component: Controls		
Annually Recurring Costs	$7,942	$335
Non-Annually Recurring Costs	$0	$0
Subtotal (for OM&R):	$193,524	$8,165

Replacements to Capital Components

Component: Heat Pump 0.5-ton - Ducted	$49,623	$2,094
Component: Heat Pump 1-ton - Ducted	$55,412	$2,338
Component: Heat Pump 1.5-ton - Ducted	$31,014	$1,309
Component: Heat Pump 0.5-ton - Ceiling	$62,028	$2,617
Component: DX DOAS - 1100 CFM	$99,245	$4,188
Component: Split System 0.5-ton - Wall	$20,676	$872
Component: Ductwork (Supply/Return) - 10.00 per LB	$25,111	$1,060
Component: Refrigerant Piping - Line Sets 50'	$11,735	$495
Component: Refrigerant Piping - Line Sets 100'	$5,695	$240
Component: Ductwork Insulation - 2	$8,438	$356
Component: Controls	$20,676	$872
Subtotal (for Replacements):	$389,654	$16,441

Residual Value of Original Capital Components

Component: Heat Pump 0.5-ton - Ducted	-$391	-$16
Component: Heat Pump 1-ton - Ducted	-$437	-$18
Component: Heat Pump 1.5-ton - Ducted	-$244	-$10
Component: Heat Pump 0.5-ton - Ceiling	-$489	-$21
Component: DX DOAS - 1100 CFM	-$782	-$33
Component: Split System 0.5-ton - Wall	-$163	-$7
Component: Ductwork (Supply/Return) - 10.00 per LB	$0	$0
Component: Refrigerant Piping - Line Sets 50'	-$587	-$25
Component: Refrigerant Piping - Line Sets 100'	$0	$0
Component: Ductwork Insulation - 2	$0	$0
Component: Controls	$0	$0
Subtotal (for Residual Value):	-$3,092	-$130

Residual Value of Capital Replacements

Component: Heat Pump 0.5-ton - Ducted	-$14,492	-$611
Component: Heat Pump 1-ton - Ducted	-$16,183	-$683
Component: Heat Pump 1.5-ton - Ducted	-$9,058	-$382
Component: Heat Pump 0.5-ton - Ceiling	-$18,115	-$764
Component: DX DOAS - 1100 CFM	-$28,984	-$1,223

Component: Split System 0.5-ton - Wall	−$6,038	−$255
Component: Ductwork (Supply/Return) - 10.00 per LB	−$22,305	−$941
Component: Refrigerant Piping - Line Sets 50'	−$1,042	−$44
Component: Refrigerant Piping - Line Sets 100'	−$3,005	−$127
Component: Ductwork Insulation - 2	−$4,452	−$188
Component: Controls	−$5,565	−$235
Subtotal (for Residual Value):	−$129,240	−$5,453
Total Life-Cycle Cost	$682,698	$28,806

Emissions Summary

Energy Name	Annual	Life-Cycle
Electricity:		
CO2	36,861.29 kg	1,474,350.79 kg
SO2	48.79 kg	1,951.29 kg
NOx	21.01 kg	840.41 kg
Total:		
CO2	36,861.29 kg	1,474,350.79 kg
SO2	48.79 kg	1,951.29 kg
NOx	21.01 kg	840.41 kg

Alternative: ALT 2: VRF with DOAS

Initial Cost Data (not Discounted)

Initial Capital Costs

(adjusted for price escalation)

Initial Capital Costs for All Components: $129,030

Component: VRF Fan Coil Unit 0.5-ton - Ducted
Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2025	100%	$12,600
Total (for Component)		$12,600

Component: VRF Fan Coil Unit 1-ton - Ducted
Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2025	100%	$14,000

Total (for Component)	$14,000

Component: VRF Fan Coil Unit 1.5-ton - Ducted
Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2025	100%	$7,800
Total (for Component)		$7,800

Component: VRF Fan Coil Unit 1-ton - Ceiling
Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2025	100%	$9,900
Total (for Component)		$9,900

Component: VRF Ductless 1-ton - Wall
Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2025	100%	$5,000
Total (for Component)		$5,000

Component: VRF Condenser 8-ton
Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2025	100%	$25,000
Total (for Component)		$25,000

Component: DX DOAS - 1100 CFM
Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2025	100%	$24,000
Total (for Component)		$24,000

Component: Ductwork (Supply/Return) - 10.00 per LB
Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2025	100%	$10,020

Total (for Component)	$10,020

Component: Refrigerant Piping - Line Sets 50'
Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2025	100%	$7,710
Total (for Component)		$7,710

Component: Ductwork Insulation - 2
Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2025	100%	$4,000
Total (for Component)		$4,000

Component: Controls
Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2025	100%	$9,000
Total (for Component)		$9,000

Energy Costs: Electricity
(base-year dollars)

Average Annual Usage	Average Price/Unit	Average Annual Cost	Average Annual Demand	Average Annual Rebate
188.3 MBtu	$26.37630	$4,968	$0	$0

Life-Cycle Cost Analysis

	Present Value	Annual Value
Initial Capital Costs	$129,030	$5,444
Energy Costs		
Energy Consumption Costs	$104,496	$4,409
Energy Demand Charges	$0	$0
Energy Utility Rebates	$0	$0
Subtotal (for Energy):	$104,496	$4,409

Water Usage Costs	$0	$0
Water Disposal Costs	$0	$0

Operating, Maintenance & Repair Costs

Component: VRF Fan Coil Unit 0.5-ton - Ducted		
Annually Recurring Costs	$30,022	$1,267
Non-Annually Recurring Costs	$0	$0
Component: VRF Fan Coil Unit 1-ton - Ducted		
Annually Recurring Costs	$33,358	$1,407
Non-Annually Recurring Costs	$0	$0
Component: VRF Fan Coil Unit 1.5-ton - Ducted		
Annually Recurring Costs	$18,585	$784
Non-Annually Recurring Costs	$0	$0
Component: VRF Fan Coil Unit 1-ton - Ceiling		
Annually Recurring Costs	$23,589	$995
Non-Annually Recurring Costs	$0	$0
Component: VRF Ductless 1-ton - Wall		
Annually Recurring Costs	$11,914	$503
Non-Annually Recurring Costs	$0	$0
Component: VRF Condenser 8-ton		
Annually Recurring Costs	$79,424	$3,351
Non-Annually Recurring Costs	$0	$0
Component: DX DOAS - 1100 CFM		
Annually Recurring Costs	$57,185	$2,413
Non-Annually Recurring Costs	$0	$0
Component: Ductwork (Supply/Return) - 10.00 per LB		
Annually Recurring Costs	$7,958	$336
Non-Annually Recurring Costs	$0	$0
Component: Refrigerant Piping - Line Sets 50'		
Annually Recurring Costs	$6,124	$258
Non-Annually Recurring Costs	$0	$0
Component: Ductwork Insulation - 2		
Annually Recurring Costs	$3,177	$134
Non-Annually Recurring Costs	$0	$0
Component: Controls		
Annually Recurring Costs	$14,296	$603

Non-Annually Recurring Costs	$0	$0
Subtotal (for OM&R):	$285,632	$12,052
Replacements to Capital Components		
Component: VRF Fan Coil Unit 0.5-ton - Ducted	$52,104	$2,198
Component: VRF Fan Coil Unit 1-ton - Ducted	$57,893	$2,443
Component: VRF Fan Coil Unit 1.5-ton - Ducted	$32,255	$1,361
Component: VRF Fan Coil Unit 1-ton - Ceiling	$40,939	$1,727
Component: VRF Ductless 1-ton - Wall	$20,676	$872
Component: VRF Condenser 8-ton	$47,015	$1,984
Component: DX DOAS - 1100 CFM	$99,245	$4,188
Component: Ductwork (Supply/Return) - 10.00 per LB	$25,111	$1,060
Component: Refrigerant Piping - Line Sets 50'	$14,500	$612
Component: Ductwork Insulation - 2	$8,438	$356
Component: Controls	$37,217	$1,570
Subtotal (for Replacements):	$435,393	$18,371
Residual Value of Original Capital Components		
Component: VRF Fan Coil Unit 0.5-ton - Ducted	-$411	-$17
Component: VRF Fan Coil Unit 1-ton - Ducted	-$456	-$19
Component: VRF Fan Coil Unit 1.5-ton - Ducted	-$254	-$11
Component: VRF Fan Coil Unit 1-ton - Ceiling	-$323	-$14
Component: VRF Ductless 1-ton - Wall	-$163	-$7
Component: VRF Condenser 8-ton	-$940	-$40
Component: DX DOAS - 1100 CFM	-$782	-$33
Component: Ductwork (Supply/Return) - 10.00 per LB	$0	$0
Component: Refrigerant Piping - Line Sets 50'	-$725	-$31
Component: Ductwork Insulation - 2	$0	$0
Component: Controls	$0	$0
Subtotal (for Residual Value):	-$4,054	-$171
Residual Value of Capital Replacements		
Component: VRF Fan Coil Unit 0.5-ton - Ducted	-$15,217	-$642
Component: VRF Fan Coil Unit 1-ton - Ducted	-$16,908	-$713

Component: VRF Fan Coil Unit 1.5-ton - Ducted	-$9,420	-$397
Component: VRF Fan Coil Unit 1-ton - Ceiling	-$11,956	-$504
Component: VRF Ductless 1-ton - Wall	-$6,038	-$255
Component: VRF Condenser 8-ton	-$1,670	-$70
Component: DX DOAS - 1100 CFM	-$28,984	-$1,223
Component: Ductwork (Supply/Return) - 10.00 per LB	-$22,305	-$941
Component: Refrigerant Piping - Line Sets 50'	-$1,287	-$54
Component: Ductwork Insulation - 2	-$4,452	-$188
Component: Controls	-$10,017	-$423
Subtotal (for Residual Value):	-$128,255	-$5,412
Total Life-Cycle Cost	$822,242	$34,693

Emissions Summary

Energy Name	Annual	Life-Cycle
Electricity:		
CO2	30,331.38 kg	1,213,172.10 kg
SO2	40.14 kg	1,605.62 kg
NOx	17.29 kg	691.53 kg
Total:		
CO2	30,331.38 kg	1,213,172.10 kg
SO2	40.14 kg	1,605.62 kg
NOx	17.29 kg	691.53 kg

Alternative: ALT 3: DX VAV AHU

Initial Cost Data (not Discounted)

Initial Capital Costs

(adjusted for price escalation)

Initial Capital Costs for All Components: $143,966

Component: VAV DX AHU - 3000 CFM
Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2025	100%	$35,000
Total (for Component)		$35,000

Component: Exhaust Fan

Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2025	100%	$1,200
Total (for Component)		$1,200

Component: VAV Elec RH - 400 CFM
Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2025	100%	$19,500
Total (for Component)		$19,500

Component: VAV Elec RH - 600 CFM
Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2025	100%	$8,700
Total (for Component)		$8,700

Component: VAV Elec RH - 800 CFM
Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2025	100%	$21,000
Total (for Component)		$21,000

Component: Ductwork (Supply/Return) - 10.00 per LB
Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2025	100%	$12,000
Total (for Component)		$12,000

Component: Ductwork Insulation - 2
Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2025	100%	$4,800
Total (for Component)		$4,800

Component: Split System 1-ton - Wall
Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2025	100%	$9,766
Total (for Component)		$9,766

Component: Controls
Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2025	100%	$32,000
Total (for Component)		$32,000

Energy Costs: Electricity
(base-year dollars)

Average Annual Usage	Average Price/Unit	Average Annual Cost	Average Annual Demand	Average Annual Rebate
183.9 MBtu	$26.37630	$4,851	$0	$0

Life-Cycle Cost Analysis

	Present Value	Annual Value
Initial Capital Costs	$143,966	$6,074
Energy Costs		
Energy Consumption Costs	$102,045	$4,306
Energy Demand Charges	$0	$0
Energy Utility Rebates	$0	$0
Subtotal (for Energy):	$102,045	$4,306
Water Usage Costs	$0	$0
Water Disposal Costs	$0	$0
Operating, Maintenance & Repair Costs		
Component: VAV DX AHU - 3000 CFM		
Annually Recurring Costs	$83,395	$3,519
Non-Annually Recurring Costs	$0	$0
Component: Exhaust Fan		

Annually Recurring Costs	$1,906	$80
Non-Annually Recurring Costs	$0	$0
Component: VAV Elec RH - 400 CFM		
Annually Recurring Costs	$15,488	$653
Non-Annually Recurring Costs	$0	$0
Component: VAV Elec RH - 600 CFM		
Annually Recurring Costs	$6,910	$292
Non-Annually Recurring Costs	$0	$0
Component: VAV Elec RH - 800 CFM		
Annually Recurring Costs	$16,679	$704
Non-Annually Recurring Costs	$0	$0
Component: Ductwork (Supply/Return) - 10.00 per LB		
Annually Recurring Costs	$9,531	$402
Non-Annually Recurring Costs	$0	$0
Component: Ductwork Insulation - 2		
Annually Recurring Costs	$3,812	$161
Non-Annually Recurring Costs	$0	$0
Component: Split System 1-ton - Wall		
Annually Recurring Costs	$15,513	$655
Non-Annually Recurring Costs	$0	$0
Component: Controls		
Annually Recurring Costs	$25,416	$1,072
Non-Annually Recurring Costs	$0	$0
Subtotal (for OM&R):	$178,649	$7,538

Replacements to Capital Components

Component: VAV DX AHU - 3000 CFM	$144,733	$6,107
Component: Exhaust Fan	$2,605	$110
Component: VAV Elec RH - 400 CFM	$36,671	$1,547
Component: VAV Elec RH - 600 CFM	$16,361	$690
Component: VAV Elec RH - 800 CFM	$39,492	$1,666
Component: Ductwork (Supply/Return) - 10.00 per LB	$30,073	$1,269
Component: Ductwork Insulation - 2	$10,125	$427
Component: Split System 1-ton - Wall	$40,385	$1,704
Component: Controls	$132,327	$5,583

Subtotal (for Replacements):	$452,773	$19,104
Residual Value of Original Capital Components		
Component: VAV DX AHU - 3000 CFM	-$1,140	-$48
Component: Exhaust Fan	-$52	-$2
Component: VAV Elec RH - 400 CFM	-$733	-$31
Component: VAV Elec RH - 600 CFM	-$327	-$14
Component: VAV Elec RH - 800 CFM	-$790	-$33
Component: Ductwork (Supply/Return) - 10.00 per LB	$0	$0
Component: Ductwork Insulation - 2	$0	$0
Component: Split System 1-ton - Wall	-$318	-$13
Component: Controls	$0	$0
Subtotal (for Residual Value):	-$3,361	-$142
Residual Value of Capital Replacements		
Component: VAV DX AHU - 3000 CFM	-$42,540	-$1,795
Component: Exhaust Fan	-$1,651	-$70
Component: VAV Elec RH - 400 CFM	-$1,302	-$55
Component: VAV Elec RH - 600 CFM	-$581	-$25
Component: VAV Elec RH - 800 CFM	-$1,402	-$59
Component: Ductwork (Supply/Return) - 10.00 per LB	-$26,713	-$1,127
Component: Ductwork Insulation - 2	-$5,343	-$225
Component: Split System 1-ton - Wall	-$11,794	-$498
Component: Controls	-$35,617	-$1,503
Subtotal (for Residual Value):	-$126,943	-$5,356
Total Life-Cycle Cost	$747,129	$31,524

Emissions Summary

Energy Name	Annual	Life-Cycle
Electricity:		
CO2	29,620.05 kg	1,184,721.05 kg
SO2	39.20 kg	1,567.96 kg
NOx	16.88 kg	675.31 kg
Total:		

CO2	29,620.05 kg	1,184,721.05 kg
SO2	39.20 kg	1,567.96 kg
NOx	16.88 kg	675.31 kg

Alternative: ALT 4: ASHRAE 90.1 BASELINE

Initial Cost Data (not Discounted)

Initial Capital Costs

(adjusted for price escalation)

Initial Capital Costs for All Components: $0

Energy Costs: Electricity

(base-year dollars)

Average Annual Usage	Average Price/Unit	Average Annual Cost	Average Annual Demand	Average Annual Rebate
247.3 MBtu	$26.37630	$6,524	$0	$0

Life-Cycle Cost Analysis

	Present Value	Annual Value
Initial Capital Costs	$0	$0
Energy Costs		
Energy Consumption Costs	$137,226	$5,790
Energy Demand Charges	$0	$0
Energy Utility Rebates	$0	$0
Subtotal (for Energy):	$137,226	$5,790
Water Usage Costs	$0	$0
Water Disposal Costs	$0	$0
Operating, Maintenance & Repair Costs		
Subtotal (for OM&R):	$0	$0
Replacements to Capital Components		
Subtotal (for Replacements):	$0	$0
Residual Value of Original Capital Components		

Subtotal (for Residual Value):	$0	$0

Residual Value of Capital Replacements

Subtotal (for Residual Value):	$0	$0

Total Life-Cycle Cost	$137,226	$5,790

Emissions Summary

Energy Name	Annual	Life-Cycle
Electricity:		
CO2	39,831.92 kg	1,593,167.58 kg
SO2	52.72 kg	2,108.54 kg
NOx	22.70 kg	908.13 kg
Total:		
CO2	39,831.92 kg	1,593,167.58 kg
SO2	52.72 kg	2,108.54 kg
NOx	22.70 kg	908.13 kg

NIST BLCC 5.3-22: Input Data Listing

Consistent with Federal Life Cycle Cost Methodology and Procedures, 10 CFR, Part 436, Subpart A

General Information

File Name:	C:\Users\chaby\Desktop\LCCA\Pine Bluff\Pine Bluff Arsenal ACP.XML
Date of Study:	Wed Sep 25 16:01:44 CDT 2024
Analysis Type:	FEMP Analysis, Energy Project
Project Name:	PBA ACP
Project Location:	Arkansas
Analyst:	CH
Comment:	ALT 1: Heat Pumps with DOAS ALT 2: VRF with DOAS ALT 3: DX VAV AHU ALT 4: ASHRAE 90.1 BASELINE
Base Date:	January 1, 2025
Service Date:	January 1, 2027
Study Period:	42 years 0 months (January 1, 2025 through December 31, 2066)
Discount Rate:	3%
Discounting Convention:	Mid-Year

Discount and Escalation Rates are REAL (exclusive of general inflation)

Alternative: ALT 1: Heat Pumps with DOAS

Comment: 0

Energy: Electricity

Annual Consumption:	228.9 MBtu
Price per Unit:	$26.37630
Demand Charge:	$0
Utility Rebate:	$0
Location:	Arkansas
Rate Schedule:	Commercial
State:	Arkansas

Usage Indices

From Date	Duration	Usage Index
January 1, 2027	Remaining	100%

Escalation Rates

From Date	Duration	Escalation
April 1, 2022	1 year 0 months	-1.51%
April 1, 2023	1 year 0 months	-2.61%

April 1, 2024	1 year 0 months	-2.13%
April 1, 2025	1 year 0 months	-1.2%
April 1, 2026	1 year 0 months	-0.08%
April 1, 2027	1 year 0 months	0.49%
April 1, 2028	1 year 0 months	0.72%
April 1, 2029	1 year 0 months	0.23%
April 1, 2030	1 year 0 months	-0.15%
April 1, 2031	1 year 0 months	-0.11%
April 1, 2032	1 year 0 months	0.38%
April 1, 2033	1 year 0 months	0.49%
April 1, 2034	1 year 0 months	-0.6%
April 1, 2035	1 year 0 months	-0.52%
April 1, 2036	1 year 0 months	-1.02%
April 1, 2037	1 year 0 months	-0.95%
April 1, 2038	1 year 0 months	-0.31%
April 1, 2039	1 year 0 months	-0.27%
April 1, 2040	1 year 0 months	-0.73%
April 1, 2041	1 year 0 months	-0.54%
April 1, 2042	1 year 0 months	-0.59%
April 1, 2043	1 year 0 months	-0.98%
April 1, 2044	1 year 0 months	-0.44%
April 1, 2045	1 year 0 months	-0.44%
April 1, 2046	1 year 0 months	-0.28%
April 1, 2047	1 year 0 months	0%
April 1, 2048	1 year 0 months	-0.28%
April 1, 2049	1 year 0 months	-0.93%
April 1, 2050	1 year 0 months	-0.24%
April 1, 2051	1 year 0 months	0%
April 1, 2052	Remaining	-0.29%

Component: Heat Pump 0.5-ton - Ducted

Comment: (2) Heat Pump 0.5-ton - Ducted @$6000

Initial Investment

Initial Cost (base-year $): $12,000

Annual Rate of Increase: 6%

Expected Asset Life: 15 years 0 months

Residual Value Factor: 2%

Cost-Phasing

Cost Adjustment Factor: 0%

Years/Months (from Date)	Date	Portion
0 years 0 months	January 1, 2025	100%

Replacement: Replacement 1

Years/Months: 15 years 0 months

Amount: $12,000

Annual Rate Of Increase: 6%

Expected Asset Life: 15 years 0 months

Residual Value Factor: 2%

Replacement: Replacement 2

Years/Months: 30 years 0 months

Amount: $12,000

Annual Rate Of Increase: 6%

Expected Asset Life: 15 years 0 months

Residual Value Factor: 34.7%

Recurring OM&R: Maintenance (3% Cost)

Amount: $360

Annual Rate of Increase: 6%

Usage Indices

From Date	Duration	Factor
January 1, 2027	Remaining	100%

Component: Heat Pump 1-ton - Ducted

Comment: (2) Heat Pump 1-ton - Ducted @$6700

Initial Investment

Initial Cost (base-year $): $13,400

Annual Rate of Increase: 6%

Expected Asset Life: 15 years 0 months

Residual Value Factor: 2%

Cost-Phasing

Cost Adjustment Factor: 0%

Years/Months (from Date)	Date	Portion
0 years 0 months	January 1, 2025	100%

Replacement: Replacement 1

Years/Months:	15 years 0 months
Amount:	$13,400
Annual Rate Of Increase:	6%
Expected Asset Life:	15 years 0 months
Residual Value Factor:	2%

Replacement: Replacement 2

Years/Months:	30 years 0 months
Amount:	$13,400
Annual Rate Of Increase:	6%
Expected Asset Life:	15 years 0 months
Residual Value Factor:	34.7%

Recurring OM&R: Maintenance (3% Cost)

Amount:	$402
Annual Rate of Increase:	6%

Usage Indices

From Date	Duration	Factor
January 1, 2027	Remaining	100%

Component: Heat Pump 1.5-ton - Ducted

Comment: (1) Heat Pump 1.5-ton - Ducted @$7500

Initial Investment

Initial Cost (base-year $):	$7,500
Annual Rate of Increase:	6%
Expected Asset Life:	15 years 0 months
Residual Value Factor:	2%

Cost-Phasing

Cost Adjustment Factor: 0%

Years/Months (from Date)	Date	Portion

0 years 0 months	January 1, 2025	100%

Replacement: Replacement 1

Years/Months:	15 years 0 months
Amount:	$7,500
Annual Rate Of Increase:	6%
Expected Asset Life:	15 years 0 months
Residual Value Factor:	2%

Replacement: Replacement 2

Years/Months:	30 years 0 months
Amount:	$7,500
Annual Rate Of Increase:	6%
Expected Asset Life:	15 years 0 months
Residual Value Factor:	34.7%

Recurring OM&R: Maintenance (3% Cost)

Amount:	$225
Annual Rate of Increase:	6%

Usage Indices

From Date	Duration	Factor
January 1, 2027	Remaining	100%

Component: Heat Pump 0.5-ton - Ceiling

Comment: (3) Heat Pump 0.5-ton - Ceiling @$5000

Initial Investment

Initial Cost (base-year $):	$15,000
Annual Rate of Increase:	6%
Expected Asset Life:	15 years 0 months
Residual Value Factor:	2%

Cost-Phasing

Cost Adjustment Factor: 0%

Years/Months (from Date)	Date	Portion
0 years 0 months	January 1, 2025	100%

Replacement: Replacement 1

Replacement: Replacement 1

Years/Months:	15 years 0 months
Amount:	$15,000
Annual Rate Of Increase:	6%
Expected Asset Life:	15 years 0 months
Residual Value Factor:	2%

Replacement: Replacement 2

Years/Months:	30 years 0 months
Amount:	$15,000
Annual Rate Of Increase:	6%
Expected Asset Life:	15 years 0 months
Residual Value Factor:	34.7%

Recurring OM&R: Maintenance (2% Cost)

Amount:	$300
Annual Rate of Increase:	6%

Usage Indices

From Date	Duration	Factor
January 1, 2027	Remaining	100%

Component: DX DOAS - 1100 CFM

Comment: (1) DX DOAS - 1100 CFM @$24000

Initial Investment

Initial Cost (base-year $):	$24,000
Annual Rate of Increase:	6%
Expected Asset Life:	15 years 0 months
Residual Value Factor:	2%

Cost-Phasing

Cost Adjustment Factor: 0%

Years/Months (from Date)	Date	Portion
0 years 0 months	January 1, 2025	100%

Replacement: Replacement 1

Years/Months:	15 years 0 months
Amount:	$24,000

Annual Rate Of Increase: 6%

Expected Asset Life: 15 years 0 months

Residual Value Factor: 2%

Replacement: Replacement 2

Years/Months: 30 years 0 months

Amount: $24,000

Annual Rate Of Increase: 6%

Expected Asset Life: 15 years 0 months

Residual Value Factor: 34.7%

Recurring OM&R: Maintenance (3% Cost)

Amount: $720

Annual Rate of Increase: 6%

Usage Indices

From Date	Duration	Factor
January 1, 2027	Remaining	100%

Component: Split System 0.5-ton - Wall

Comment: (2) Split System 0.5-ton - Wall @$2500

Initial Investment

Initial Cost (base-year $): $5,000

Annual Rate of Increase: 6%

Expected Asset Life: 15 years 0 months

Residual Value Factor: 2%

Cost-Phasing

Cost Adjustment Factor: 0%

Years/Months (from Date)	Date	Portion
0 years 0 months	January 1, 2025	100%

Replacement: Replacement 1

Years/Months: 15 years 0 months

Amount: $5,000

Annual Rate Of Increase: 6%

Expected Asset Life: 15 years 0 months

Residual Value Factor: 2%

Replacement: Replacement 2

Years/Months: 30 years 0 months

Amount: $5,000

Annual Rate Of Increase: 6%

Expected Asset Life: 15 years 0 months

Residual Value Factor: 34.7%

Recurring OM&R: Maintenance (2% Cost)

Amount: $100

Annual Rate of Increase: 6%

Usage Indices

From Date	Duration	Factor
January 1, 2027	Remaining	100%

Component: Ductwork (Supply/Return) - 10.00 per LB

Comment: (1000) Ductwork (Supply/Return) - 10.00 per LB @$10.02

Initial Investment

Initial Cost (base-year $): $10,020

Annual Rate of Increase: 6%

Expected Asset Life: 30 years 0 months

Residual Value Factor: 0%

Cost-Phasing

Cost Adjustment Factor: 0%

Years/Months (from Date)	Date	Portion
0 years 0 months	January 1, 2025	100%

Replacement: Replacement 1

Years/Months: 30 years 0 months

Amount: $10,020

Annual Rate Of Increase: 6%

Expected Asset Life: 30 years 0 months

Residual Value Factor: 66.7%

Recurring OM&R: Maintenance (1% Cost)

Amount: $100

Annual Rate of Increase: 6%

Usage Indices

From Date	Duration	Factor
January 1, 2027	Remaining	100%

Component: Refrigerant Piping - Line Sets 50'

Comment: (8) Refrigerant Piping - Line Sets 50' @$780

Initial Investment

Initial Cost (base-year $): $6,240

Annual Rate of Increase: 6%

Expected Asset Life: 20 years 0 months

Residual Value Factor: 5%

Cost-Phasing

Cost Adjustment Factor: 0%

Years/Months (from Date)	Date	Portion
0 years 0 months	January 1, 2025	100%

Replacement: Replacement 1

Years/Months: 20 years 0 months

Amount: $6,240

Annual Rate Of Increase: 6%

Expected Asset Life: 20 years 0 months

Residual Value Factor: 5%

Recurring OM&R: Maintenance (1% Cost)

Amount: $62

Annual Rate of Increase: 6%

Usage Indices

From Date	Duration	Factor
January 1, 2027	Remaining	100%

Component: Refrigerant Piping - Line Sets 100'

Comment: (2) Refrigerant Piping - Line Sets 100' @$1350

Initial Investment

Initial Cost (base-year $): $2,700

Annual Rate of Increase: 6%

Expected Asset Life: 24 years 0 months

Residual Value Factor: 0%

Cost-Phasing

Cost Adjustment Factor: 0%

Years/Months (from Date)	Date	Portion
0 years 0 months	January 1, 2025	100%

Replacement: Replacement 1

Years/Months: 24 years 0 months

Amount: $2,700

Annual Rate Of Increase: 6%

Expected Asset Life: 24 years 0 months

Residual Value Factor: 33.3%

Recurring OM&R: Maintenance (1% Cost)

Amount: $27

Annual Rate of Increase: 6%

Usage Indices

From Date	Duration	Factor
January 1, 2027	Remaining	100%

Component: Ductwork Insulation - 2

Comment: (1000) Ductwork Insulation - 2 @$4

Initial Investment

Initial Cost (base-year $): $4,000

Annual Rate of Increase: 6%

Expected Asset Life: 24 years 0 months

Residual Value Factor: 0%

Cost-Phasing

Cost Adjustment Factor: 0%

Years/Months (from Date)	Date	Portion

0 years 0 months	January 1, 2025	100%

Replacement: Replacement 1

Years/Months: 24 years 0 months

Amount: $4,000

Annual Rate Of Increase: 6%

Expected Asset Life: 24 years 0 months

Residual Value Factor: 33.3%

Recurring OM&R: Maintenance (1% Cost)

Amount: $40

Annual Rate of Increase: 6%

Usage Indices

From Date	Duration	Factor
January 1, 2027	Remaining	100%

Component: Controls

Comment: (1) Controls @$5000

Initial Investment

Initial Cost (base-year $): $5,000

Annual Rate of Increase: 6%

Expected Asset Life: 15 years 0 months

Residual Value Factor: 0%

Cost-Phasing

Cost Adjustment Factor: 0%

Years/Months (from Date)	Date	Portion
0 years 0 months	January 1, 2025	100%

Replacement: Replacement 1

Years/Months: 15 years 0 months

Amount: $5,000

Annual Rate Of Increase: 6%

Expected Asset Life: 15 years 0 months

Residual Value Factor: 0%

Replacement: Replacement 2

Replacement: Replacement 2

Years/Months:	30 years 0 months
Amount:	$5,000
Annual Rate Of Increase:	6%
Expected Asset Life:	15 years 0 months
Residual Value Factor:	33.3%

Recurring OM&R: Maintenance (2% Cost)

Amount:	$100
Annual Rate of Increase:	6%

Usage Indices

From Date	Duration	Factor
January 1, 2027	Remaining	100%

Alternative: ALT 2: VRF with DOAS

Comment: 0

Energy: Electricity

Annual Consumption:	188.3 MBtu
Price per Unit:	$26.37630
Demand Charge:	$0
Utility Rebate:	$0
Location:	Arkansas
Rate Schedule:	Commercial
State:	Arkansas

Usage Indices

From Date	Duration	Usage Index
January 1, 2027	Remaining	100%

Escalation Rates

From Date	Duration	Escalation
April 1, 2022	1 year 0 months	-1.51%
April 1, 2023	1 year 0 months	-2.61%
April 1, 2024	1 year 0 months	-2.13%
April 1, 2025	1 year 0 months	-1.2%
April 1, 2026	1 year 0 months	-0.08%
April 1, 2027	1 year 0 months	0.49%

April 1, 2028	1 year 0 months	0.72%
April 1, 2029	1 year 0 months	0.23%
April 1, 2030	1 year 0 months	-0.15%
April 1, 2031	1 year 0 months	-0.11%
April 1, 2032	1 year 0 months	0.38%
April 1, 2033	1 year 0 months	0.49%
April 1, 2034	1 year 0 months	-0.6%
April 1, 2035	1 year 0 months	-0.52%
April 1, 2036	1 year 0 months	-1.02%
April 1, 2037	1 year 0 months	-0.95%
April 1, 2038	1 year 0 months	-0.31%
April 1, 2039	1 year 0 months	-0.27%
April 1, 2040	1 year 0 months	-0.73%
April 1, 2041	1 year 0 months	-0.54%
April 1, 2042	1 year 0 months	-0.59%
April 1, 2043	1 year 0 months	-0.98%
April 1, 2044	1 year 0 months	-0.44%
April 1, 2045	1 year 0 months	-0.44%
April 1, 2046	1 year 0 months	-0.28%
April 1, 2047	1 year 0 months	0%
April 1, 2048	1 year 0 months	-0.28%
April 1, 2049	1 year 0 months	-0.93%
April 1, 2050	1 year 0 months	-0.24%
April 1, 2051	1 year 0 months	0%
April 1, 2052	Remaining	-0.29%

Component: VRF Fan Coil Unit 0.5-ton - Ducted

Comment: (2) VRF Fan Coil Unit 0.5-ton - Ducted @$6300

Initial Investment

Initial Cost (base-year $):	$12,600
Annual Rate of Increase:	6%
Expected Asset Life:	15 years 0 months
Residual Value Factor:	2%

Cost-Phasing

Cost Adjustment Factor: 0%

Years/Months (from Date)	Date	Portion
0 years 0 months	January 1, 2025	100%

Replacement: Replacement 1

Years/Months:	15 years 0 months
Amount:	$12,600
Annual Rate Of Increase:	6%
Expected Asset Life:	15 years 0 months
Residual Value Factor:	2%

Replacement: Replacement 2

Years/Months:	30 years 0 months
Amount:	$12,600
Annual Rate Of Increase:	6%
Expected Asset Life:	15 years 0 months
Residual Value Factor:	34.7%

Recurring OM&R: Maintenance (3% Cost)

Amount:	$378
Annual Rate of Increase:	6%

Usage Indices

From Date	Duration	Factor
January 1, 2027	Remaining	100%

Component: VRF Fan Coil Unit 1-ton - Ducted

Comment: (2) VRF Fan Coil Unit 1-ton - Ducted @$7000

Initial Investment

Initial Cost (base-year $):	$14,000
Annual Rate of Increase:	6%
Expected Asset Life:	15 years 0 months
Residual Value Factor:	2%

Cost-Phasing

Cost Adjustment Factor: 0%

Years/Months (from Date)	Date	Portion
0 years 0 months	January 1, 2025	100%

Replacement: Replacement 1

Years/Months:	15 years 0 months
Amount:	$14,000
Annual Rate Of Increase:	6%
Expected Asset Life:	15 years 0 months
Residual Value Factor:	2%

Replacement: Replacement 2

Years/Months:	30 years 0 months
Amount:	$14,000
Annual Rate Of Increase:	6%
Expected Asset Life:	15 years 0 months
Residual Value Factor:	34.7%

Recurring OM&R: Maintenance (3% Cost)

Amount:	$420
Annual Rate of Increase:	6%

Usage Indices

From Date	Duration	Factor
January 1, 2027	Remaining	100%

Component: VRF Fan Coil Unit 1.5-ton - Ducted

Comment: (1) VRF Fan Coil Unit 1.5-ton - Ducted @$7800

Initial Investment

Initial Cost (base-year $):	$7,800
Annual Rate of Increase:	6%
Expected Asset Life:	15 years 0 months
Residual Value Factor:	2%

Cost-Phasing

Cost Adjustment Factor: 0%

Years/Months (from Date)	Date	Portion
0 years 0 months	January 1, 2025	100%

Replacement: Replacement 1

Years/Months:	15 years 0 months

Amount: $7,800

Annual Rate Of Increase: 6%

Expected Asset Life: 15 years 0 months

Residual Value Factor: 2%

Replacement: Replacement 2

Years/Months: 30 years 0 months

Amount: $7,800

Annual Rate Of Increase: 6%

Expected Asset Life: 15 years 0 months

Residual Value Factor: 34.7%

Recurring OM&R: Maintenance (3% Cost)

Amount: $234

Annual Rate of Increase: 6%

Usage Indices

From Date	Duration	Factor
January 1, 2027	Remaining	100%

Component: VRF Fan Coil Unit 1-ton - Ceiling

Comment: (3) VRF Fan Coil Unit 1-ton - Ceiling @$3300

Initial Investment

Initial Cost (base-year $): $9,900

Annual Rate of Increase: 6%

Expected Asset Life: 15 years 0 months

Residual Value Factor: 2%

Cost-Phasing

Cost Adjustment Factor: 0%

Years/Months (from Date)	Date	Portion
0 years 0 months	January 1, 2025	100%

Replacement: Replacement 1

Years/Months: 15 years 0 months

Amount: $9,900

Annual Rate Of Increase: 6%

Expected Asset Life: 15 years 0 months

Expected Asset Life: 15 years 0 months

Residual Value Factor: 2%

Replacement: Replacement 2

Years/Months: 30 years 0 months

Amount: $9,900

Annual Rate Of Increase: 6%

Expected Asset Life: 15 years 0 months

Residual Value Factor: 34.7%

Recurring OM&R: Maintenance (3% Cost)

Amount: $297

Annual Rate of Increase: 6%

Usage Indices

From Date	Duration	Factor
January 1, 2027	Remaining	100%

Component: VRF Ductless 1-ton - Wall

Comment: (2) VRF Ductless 1-ton - Wall @$2500

Initial Investment

Initial Cost (base-year $): $5,000

Annual Rate of Increase: 6%

Expected Asset Life: 15 years 0 months

Residual Value Factor: 2%

Cost-Phasing

Cost Adjustment Factor: 0%

Years/Months (from Date)	Date	Portion
0 years 0 months	January 1, 2025	100%

Replacement: Replacement 1

Years/Months: 15 years 0 months

Amount: $5,000

Annual Rate Of Increase: 6%

Expected Asset Life: 15 years 0 months

Residual Value Factor: 2%

Replacement: Replacement 2

Years/Months:	30 years 0 months
Amount:	$5,000
Annual Rate Of Increase:	6%
Expected Asset Life:	15 years 0 months
Residual Value Factor:	34.7%

Recurring OM&R: Maintenance (3% Cost)

Amount:	$150
Annual Rate of Increase:	6%

Usage Indices

From Date	Duration	Factor
January 1, 2027	Remaining	100%

Component: VRF Condenser 8-ton

Comment: (1) VRF Condenser 8-ton @$25000

Initial Investment

Initial Cost (base-year $):	$25,000
Annual Rate of Increase:	6%
Expected Asset Life:	20 years 0 months
Residual Value Factor:	2%

Cost-Phasing

Cost Adjustment Factor: 0%

Years/Months (from Date)	Date	Portion
0 years 0 months	January 1, 2025	100%

Replacement: Replacement 1

Years/Months:	20 years 0 months
Amount:	$25,000
Annual Rate Of Increase:	6%
Expected Asset Life:	20 years 0 months
Residual Value Factor:	2%

Recurring OM&R: Maintenance (4% Cost)

Amount:	$1,000

Annual Rate of Increase: 6%

Usage Indices

From Date	Duration	Factor
January 1, 2027	Remaining	100%

Component: DX DOAS - 1100 CFM

Comment: (1) DX DOAS - 1100 CFM @$24000

Initial Investment

Initial Cost (base-year $): $24,000

Annual Rate of Increase: 6%

Expected Asset Life: 15 years 0 months

Residual Value Factor: 2%

Cost-Phasing

Cost Adjustment Factor: 0%

Years/Months (from Date)	Date	Portion
0 years 0 months	January 1, 2025	100%

Replacement: Replacement 1

Years/Months: 15 years 0 months

Amount: $24,000

Annual Rate Of Increase: 6%

Expected Asset Life: 15 years 0 months

Residual Value Factor: 2%

Replacement: Replacement 2

Years/Months: 30 years 0 months

Amount: $24,000

Annual Rate Of Increase: 6%

Expected Asset Life: 15 years 0 months

Residual Value Factor: 34.7%

Recurring OM&R: Maintenance (3% Cost)

Amount: $720

Annual Rate of Increase: 6%

Usage Indices

From Date	Duration	Factor
January 1, 2027	Remaining	100%

Component: Ductwork (Supply/Return) - 10.00 per LB

Comment: (1000) Ductwork (Supply/Return) - 10.00 per LB @$10.02

Initial Investment

Initial Cost (base-year $): $10,020

Annual Rate of Increase: 6%

Expected Asset Life: 30 years 0 months

Residual Value Factor: 0%

Cost-Phasing

Cost Adjustment Factor: 0%

Years/Months (from Date)	Date	Portion
0 years 0 months	January 1, 2025	100%

Replacement: Replacement 1

Years/Months: 30 years 0 months

Amount: $10,020

Annual Rate Of Increase: 6%

Expected Asset Life: 30 years 0 months

Residual Value Factor: 66.7%

Recurring OM&R: Maintenance (1% Cost)

Amount: $100

Annual Rate of Increase: 6%

Usage Indices

From Date	Duration	Factor
January 1, 2027	Remaining	100%

Component: Refrigerant Piping - Line Sets 50'

Comment: (10) Refrigerant Piping - Line Sets 50' @$771.04

Initial Investment

Initial Cost (base-year $): $7,710

Annual Rate of Increase: 6%

Expected Asset Life: 30 years 0 months

Expected Asset Life: 20 years 0 months

Residual Value Factor: 5%

Cost-Phasing

Cost Adjustment Factor: 0%

Years/Months (from Date)	Date	Portion
0 years 0 months	January 1, 2025	100%

Replacement: Replacement 1

Years/Months: 20 years 0 months

Amount: $7,710

Annual Rate Of Increase: 6%

Expected Asset Life: 20 years 0 months

Residual Value Factor: 5%

Recurring OM&R: Maintenance (1% Cost)

Amount: $77

Annual Rate of Increase: 6%

Usage Indices

From Date	Duration	Factor
January 1, 2027	Remaining	100%

Component: Ductwork Insulation - 2

Comment: (1000) Ductwork Insulation - 2 @$4

Initial Investment

Initial Cost (base-year $): $4,000

Annual Rate of Increase: 6%

Expected Asset Life: 24 years 0 months

Residual Value Factor: 0%

Cost-Phasing

Cost Adjustment Factor: 0%

Years/Months (from Date)	Date	Portion
0 years 0 months	January 1, 2025	100%

Replacement: Replacement 1

Years/Months: 24 years 0 months

Amount: $4,000

Annual Rate Of Increase: 6%

Expected Asset Life: 24 years 0 months

Residual Value Factor: 33.3%

Recurring OM&R: Maintenance (1% Cost)

Amount: $40

Annual Rate of Increase: 6%

Usage Indices

From Date	Duration	Factor
January 1, 2027	Remaining	100%

Component: Controls

Comment: (1) Controls @$9000

Initial Investment

Initial Cost (base-year $): $9,000

Annual Rate of Increase: 6%

Expected Asset Life: 15 years 0 months

Residual Value Factor: 0%

Cost-Phasing

Cost Adjustment Factor: 0%

Years/Months (from Date)	Date	Portion
0 years 0 months	January 1, 2025	100%

Replacement: Replacement 1

Years/Months: 15 years 0 months

Amount: $9,000

Annual Rate Of Increase: 6%

Expected Asset Life: 15 years 0 months

Residual Value Factor: 0%

Replacement: Replacement 2

Years/Months: 30 years 0 months

Amount: $9,000

Annual Rate Of Increase: 6%

Expected Asset Life: 15 years 0 months

Expected Asset Life: 15 years 0 months

Residual Value Factor: 33.3%

Recurring OM&R: Maintenance (2% Cost)

Amount: $180

Annual Rate of Increase: 6%

Usage Indices

From Date	Duration	Factor
January 1, 2027	Remaining	100%

Alternative: ALT 3: DX VAV AHU

Comment: 0

Energy: Electricity

Annual Consumption: 183.9 MBtu

Price per Unit: $26.37630

Demand Charge: $0

Utility Rebate: $0

Location: Arkansas

Rate Schedule: Commercial

State: Arkansas

Usage Indices

From Date	Duration	Usage Index
January 1, 2027	Remaining	100%

Escalation Rates

From Date	Duration	Escalation
April 1, 2022	1 year 0 months	-1.51%
April 1, 2023	1 year 0 months	-2.61%
April 1, 2024	1 year 0 months	-2.13%
April 1, 2025	1 year 0 months	-1.2%
April 1, 2026	1 year 0 months	-0.08%
April 1, 2027	1 year 0 months	0.49%
April 1, 2028	1 year 0 months	0.72%
April 1, 2029	1 year 0 months	0.23%
April 1, 2030	1 year 0 months	-0.15%
April 1, 2031	1 year 0 months	-0.11%

April 1, 2032	1 year 0 months	0.38%
April 1, 2033	1 year 0 months	0.49%
April 1, 2034	1 year 0 months	-0.6%
April 1, 2035	1 year 0 months	-0.52%
April 1, 2036	1 year 0 months	-1.02%
April 1, 2037	1 year 0 months	-0.95%
April 1, 2038	1 year 0 months	-0.31%
April 1, 2039	1 year 0 months	-0.27%
April 1, 2040	1 year 0 months	-0.73%
April 1, 2041	1 year 0 months	-0.54%
April 1, 2042	1 year 0 months	-0.59%
April 1, 2043	1 year 0 months	-0.98%
April 1, 2044	1 year 0 months	-0.44%
April 1, 2045	1 year 0 months	-0.44%
April 1, 2046	1 year 0 months	-0.28%
April 1, 2047	1 year 0 months	0%
April 1, 2048	1 year 0 months	-0.28%
April 1, 2049	1 year 0 months	-0.93%
April 1, 2050	1 year 0 months	-0.24%
April 1, 2051	1 year 0 months	0%
April 1, 2052	Remaining	-0.29%

Component: VAV DX AHU - 3000 CFM

Comment: (1) VAV DX AHU - 3000 CFM @$35000

Initial Investment

Initial Cost (base-year $): $35,000

Annual Rate of Increase: 6%

Expected Asset Life: 15 years 0 months

Residual Value Factor: 2%

Cost-Phasing

Cost Adjustment Factor: 0%

Years/Months (from Date)	Date	Portion
0 years 0 months	January 1, 2025	100%

Replacement: Replacement 1

Years/Months: 15 years 0 months

Years/Months:	15 years 0 months
Amount:	$35,000
Annual Rate Of Increase:	6%
Expected Asset Life:	20 years 0 months
Residual Value Factor:	2%

Replacement: Replacement 2

Years/Months:	30 years 0 months
Amount:	$35,000
Annual Rate Of Increase:	6%
Expected Asset Life:	15 years 0 months
Residual Value Factor:	34.7%

Recurring OM&R: Maintenance (3% Cost)

Amount:	$1,050
Annual Rate of Increase:	6%

Usage Indices

From Date	Duration	Factor
January 1, 2027	Remaining	100%

Component: Exhaust Fan

Comment: (1) Exhaust Fan @$1200

Initial Investment

Initial Cost (base-year $):	$1,200
Annual Rate of Increase:	6%
Expected Asset Life:	25 years 0 months
Residual Value Factor:	2%

Cost-Phasing

Cost Adjustment Factor: 0%

Years/Months (from Date)	Date	Portion
0 years 0 months	January 1, 2025	100%

Replacement: Replacement 1

Years/Months:	25 years 0 months
Amount:	$1,200
Annual Rate Of Increase:	6%

Expected Asset Life: 25 years 0 months

Residual Value Factor: 41.2%

Recurring OM&R: Maintenance (2% Cost)

Amount: $24

Annual Rate of Increase: 6%

Usage Indices

From Date	Duration	Factor
January 1, 2027	Remaining	100%

Component: VAV Elec RH - 400 CFM

Comment: (3) VAV Elec RH - 400 CFM @$6500

Initial Investment

Initial Cost (base-year $): $19,500

Annual Rate of Increase: 6%

Expected Asset Life: 20 years 0 months

Residual Value Factor: 2%

Cost-Phasing

Cost Adjustment Factor: 0%

Years/Months (from Date)	Date	Portion
0 years 0 months	January 1, 2025	100%

Replacement: Replacement 1

Years/Months: 20 years 0 months

Amount: $19,500

Annual Rate Of Increase: 6%

Expected Asset Life: 20 years 0 months

Residual Value Factor: 2%

Recurring OM&R: Maintenance (1% Cost)

Amount: $195

Annual Rate of Increase: 6%

Usage Indices

From Date	Duration	Factor
January 1, 2027	Remaining	100%

January 1, 2027	Remaining	100%

Component: VAV Elec RH - 600 CFM

Comment: (1) VAV Elec RH - 600 CFM @$8700

Initial Investment

Initial Cost (base-year $):	$8,700
Annual Rate of Increase:	6%
Expected Asset Life:	20 years 0 months
Residual Value Factor:	2%

Cost-Phasing

Cost Adjustment Factor: 0%

Years/Months (from Date)	Date	Portion
0 years 0 months	January 1, 2025	100%

Replacement: Replacement 1

Years/Months:	20 years 0 months
Amount:	$8,700
Annual Rate Of Increase:	6%
Expected Asset Life:	20 years 0 months
Residual Value Factor:	2%

Recurring OM&R: Maintenance (1% Cost)

Amount:	$87
Annual Rate of Increase:	6%

Usage Indices

From Date	Duration	Factor
January 1, 2027	Remaining	100%

Component: VAV Elec RH - 800 CFM

Comment: (2) VAV Elec RH - 800 CFM @$10500

Initial Investment

Initial Cost (base-year $):	$21,000
Annual Rate of Increase:	6%
Expected Asset Life:	20 years 0 months
Residual Value Factor:	2%

Cost-Phasing

Cost Adjustment Factor: 0%

Years/Months (from Date)	Date	Portion
0 years 0 months	January 1, 2025	100%

Replacement: Replacement 1

Years/Months: 20 years 0 months

Amount: $21,000

Annual Rate Of Increase: 6%

Expected Asset Life: 20 years 0 months

Residual Value Factor: 2%

Recurring OM&R: Maintenance (1% Cost)

Amount: $210

Annual Rate of Increase: 6%

Usage Indices

From Date	Duration	Factor
January 1, 2027	Remaining	100%

Component: Ductwork (Supply/Return) - 10.00 per LB

Comment: (1200) Ductwork (Supply/Return) - 10.00 per LB @$10

Initial Investment

Initial Cost (base-year $): $12,000

Annual Rate of Increase: 6%

Expected Asset Life: 30 years 0 months

Residual Value Factor: 0%

Cost-Phasing

Cost Adjustment Factor: 0%

Years/Months (from Date)	Date	Portion
0 years 0 months	January 1, 2025	100%

Replacement: Replacement 1

Years/Months: 30 years 0 months

Amount: $12,000

Annual Rate Of Increase: 6%

Annual Rate Of Increase: 6%

Expected Asset Life: 30 years 0 months

Residual Value Factor: 66.7%

Recurring OM&R: Maintenance (1% Cost)

Amount: $120

Annual Rate of Increase: 6%

Usage Indices

From Date	Duration	Factor
January 1, 2027	Remaining	100%

Component: Ductwork Insulation - 2

Comment: (1200) Ductwork Insulation - 2 @$4

Initial Investment

Initial Cost (base-year $): $4,800

Annual Rate of Increase: 6%

Expected Asset Life: 24 years 0 months

Residual Value Factor: 0%

Cost-Phasing

Cost Adjustment Factor: 0%

Years/Months (from Date)	Date	Portion
0 years 0 months	January 1, 2025	100%

Replacement: Replacement 1

Years/Months: 24 years 0 months

Amount: $4,800

Annual Rate Of Increase: 6%

Expected Asset Life: 24 years 0 months

Residual Value Factor: 33.3%

Recurring OM&R: Maintenance (1% Cost)

Amount: $48

Annual Rate of Increase: 6%

Usage Indices

From Date	Duration	Factor

January 1, 2027	Remaining	100%

Component: Split System 1-ton - Wall

Comment: (2) Split System 1-ton - Wall @$4883

Initial Investment

Initial Cost (base-year $):	$9,766
Annual Rate of Increase:	6%
Expected Asset Life:	15 years 0 months
Residual Value Factor:	2%

Cost-Phasing

Cost Adjustment Factor: 0%

Years/Months (from Date)	Date	Portion
0 years 0 months	January 1, 2025	100%

Replacement: Replacement 1

Years/Months:	15 years 0 months
Amount:	$9,766
Annual Rate Of Increase:	6%
Expected Asset Life:	15 years 0 months
Residual Value Factor:	2%

Replacement: Replacement 2

Years/Months:	30 years 0 months
Amount:	$9,766
Annual Rate Of Increase:	6%
Expected Asset Life:	15 years 0 months
Residual Value Factor:	34.7%

Recurring OM&R: Maintenance (2% Cost)

Amount:	$195
Annual Rate of Increase:	6%

Usage Indices

From Date	Duration	Factor
January 1, 2027	Remaining	100%

Component: Controls

Component: Controls

Comment: (40) Controls @$800

Initial Investment

Initial Cost (base-year $):	$32,000
Annual Rate of Increase:	6%
Expected Asset Life:	15 years 0 months
Residual Value Factor:	0%

Cost-Phasing

Cost Adjustment Factor: 0%

Years/Months (from Date)	Date	Portion
0 years 0 months	January 1, 2025	100%

Replacement: Replacement 1

Years/Months:	15 years 0 months
Amount:	$32,000
Annual Rate Of Increase:	6%
Expected Asset Life:	15 years 0 months
Residual Value Factor:	0%

Replacement: Replacement 2

Years/Months:	30 years 0 months
Amount:	$32,000
Annual Rate Of Increase:	6%
Expected Asset Life:	15 years 0 months
Residual Value Factor:	33.3%

Recurring OM&R: Maintenance (1% Cost)

Amount:	$320
Annual Rate of Increase:	6%

Usage Indices

From Date	Duration	Factor
January 1, 2027	Remaining	100%

Alternative: ALT 4: ASHRAE 90.1 BASELINE

Comment: 0

Energy: Electricity

Annual Consumption:	247.3 MBtu
Price per Unit:	$26.37630
Demand Charge:	$0
Utility Rebate:	$0
Location:	Arkansas
Rate Schedule:	Commercial
State:	Arkansas

Usage Indices

From Date	Duration	Usage Index
January 1, 2027	Remaining	100%

Escalation Rates

From Date	Duration	Escalation
April 1, 2022	1 year 0 months	-1.51%
April 1, 2023	1 year 0 months	-2.61%
April 1, 2024	1 year 0 months	-2.13%
April 1, 2025	1 year 0 months	-1.2%
April 1, 2026	1 year 0 months	-0.08%
April 1, 2027	1 year 0 months	0.49%
April 1, 2028	1 year 0 months	0.72%
April 1, 2029	1 year 0 months	0.23%
April 1, 2030	1 year 0 months	-0.15%
April 1, 2031	1 year 0 months	-0.11%
April 1, 2032	1 year 0 months	0.38%
April 1, 2033	1 year 0 months	0.49%
April 1, 2034	1 year 0 months	-0.6%
April 1, 2035	1 year 0 months	-0.52%
April 1, 2036	1 year 0 months	-1.02%
April 1, 2037	1 year 0 months	-0.95%
April 1, 2038	1 year 0 months	-0.31%
April 1, 2039	1 year 0 months	-0.27%
April 1, 2040	1 year 0 months	-0.73%
April 1, 2041	1 year 0 months	-0.54%
April 1, 2042	1 year 0 months	-0.59%
April 1, 2043	1 year 0 months	-0.98%
April 1, 2044	1 year 0 months	-0.44%

April 1, 2044	1 year 0 months	−0.11%
April 1, 2045	1 year 0 months	−0.44%
April 1, 2046	1 year 0 months	−0.28%
April 1, 2047	1 year 0 months	0%
April 1, 2048	1 year 0 months	−0.28%
April 1, 2049	1 year 0 months	−0.93%
April 1, 2050	1 year 0 months	−0.24%
April 1, 2051	1 year 0 months	0%
April 1, 2052	Remaining	−0.29%

APPENDIX O
DRAINAGE REPORT

2026

PINE BLUFF ARSENAL-ACP DRAINAGE REPORT

(*For Information Only*)

Prepared by:
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KENALL INC
4/3/2026

Reviewed by: Rajesh Tolikonda, PE
4/11/2026

TABLE OF CONTENTS

1.0 PROJECT OVERVIEW 2
1.1 INTRODUCTION 2
1.2 PROJECT LOCATION 2
1.3 FLOODPLAIN INFORMATION 2
1.4 ENERGY INDEPENDENCE AND SECURITY ACT (EISA) 438 3
2.0 EXISTING CONDITION 3
3.0 PROPOSED IMPROVEMENTS 4
3.1 PROPOSED DRAINAGE FEATURES 4
3.2 DETENTION POND 5
4.0 DATA COLLECTION 6
4.1 RAINFALL DATA 6
4.2 SOIL DATA 6
4.3 TOPOGRAPHIC SURVEY DATA 6
4.4 LAND COVER DATA 6
5.0 METHODS OF ANALYSIS 7
5.1 HYDROLOGIC & HYDRAULIC ANALYSIS (DRAINAGE SYSTEM) 7
5.1.1 USACE - HEC-HMS MODELING: 7
5.1.2 USEPA-SWMM (STORMWATER MANAGEMENT MODEL) 7
6.0 EROSION AND SEDIMENT CONTROL 9
7.0 RESULTS AND DISCUSSION 9
8.0 CONCLUSION 11
EXHIBITS 12

LIST OF TABLES

TABLE 1 : EXISTING OUTFALLS 3
TABLE 2 : DETENTION POND SYSTEM DATA 5
TABLE 3 : DETENTION POND STAGE-AREA-STORAGE (FREEBOARD = 0.5') 5
TABLE 4 : PEAK FLOW SUMMARY (PREDEVELOPMENT VS POST DEVELOPMENT 10
TABLE 5 : DETENTION POND SUMMARY 10

1.0 PROJECT OVERVIEW

1.1 INTRODUCTION

Hana-Kenall JV is currently under contract with US Army Corps of Engineers Little Rock District under Task Order W9127S24F6002 of Contract No. W9127S23D6035, to produce a design package for the construction of a new Access Control Point (ACP) at Pine Bluff Arsenal (PBA). Within the scope, implementation of new drainage system is required to mitigate overtopping and flooding issues during the design storm events along with controlled release of stormwater flow to the existing outfalls using a detention pond. To that end, the primary purpose of this drainage study is to provide an overview of the analysis that was used to evaluate the existing hydrologic conditions and provide design for proposed drainage system to reduce overtopping and inundation issues from design storm events (e.g. 25-year, and 100-year). The hydrologic and hydraulic design, modeling, methodologies, and assumptions used in this analysis will be outlined below.

1.2 PROJECT LOCATION

The Pine Bluff Arsenal ACP Project is located within Jefferson County, Arkansas, positioned near the internal intersection of Hoadley Road, Sibert Road, and Clark Road inside the secured installation boundary (**EXHIBIT A**). The project site lies approximately 3.5 miles east of U.S. Highway 65, the primary north–south corridor serving the City of Pine Bluff, and roughly 2.8 miles north of U.S. Highway 79, which provides regional connectivity toward Little Rock and Stuttgart. As shown on the location map, the project area sits just northeast of the Mopac Railroad alignment and south of Faris Road, surrounded by dense woodland within the central portion of the Arsenal. This strategic siting supports controlled access operations while maintaining proximity to critical regional transportation routes.

1.3 FLOODPLAIN INFORMATION

According to FEMA Flood Insurance Rate Map (FIRM) Panel 05069C0165D (effective date March 16, 2009), The project site lies entirely within FEMA Zone X, designated as an Area of Minimal Flood Hazard, with no mapped 1% annual-chance (Zone AE) floodplain affecting the ACP footprint (**EXHIBIT B**). As shown on the FEMA FIRMette, the nearest Zone AE floodway and 23-ft BFE corridor is located south of the site, beyond the Mopac Railroad embankment. No regulatory floodway crosses or influences the project area, and no Base Flood EL (BFE) is assigned within the project limits.

1.4 ENERGY INDEPENDENCE AND SECURITY ACT (EISA) 438

This project is mandated to meet the EISA Section 438 retention volume requirements to mitigate the impact of the proposed development on stormwater runoff by employing Low Impact Development (LID) practices. Due to the limited soil infiltration capacity and space constraints, LID practices are not feasible to control the stormwater runoff. However, controlled release of stormwater to the existing outfall can offer an effective stormwater management for this site. The net impervious increase from the proposed development is 3.647 acre. The increased runoff for this proposed development will be managed via detention pond strategy. The net runoff volume increase for 95th percentile rainfall (2.1 inch) is 20,322.70 cubic feet (**EXHIBIT J**).

2.0 EXISTING CONDITION

The project area is bounded by Hoadley Road to the north and Clark Road along the south and east, with a total drainage area of approximately 9.49 acres. Existing area is delineated into subcatchments based on their land use type using surveyed topography and observed flow paths, as shown in **EXHIBIT C**. The primary wooded area designated for development covers 6.50 acres (subcatchment A-1), while 1.9 acres consist of roadway segments associated with Dayton Road and Hoadley Road (subcatchments A-4, A-5, &A-6) in **EXHIBIT K**. Existing drainage infrastructure surrounding the site includes roadside ditches, swales, several curb, and grate inlets, and approximately six culverts ranging from 15-inch to 24-inch diameter beneath nearby roadways, as documented in **EXHIBIT D** and Table 1. A set of privately owned railroad tracks along the western boundary also influences the local drainage pattern. Stormwater from the undeveloped portion of the site flows as sheet flow transitioning to shallow concentrated flow, generally draining toward the lowest elevation near EL 242 as per **EXHIBIT C**. The dominant soil type within the project area is Amy Silt Loam (0–1% slope), NRCS map unit AR660, classified as Hydrologic Soil Group C/D, indicating relatively poor drainage and higher runoff potential (**EXHIBIT F**). The northwestern portion of the site is paved with aged asphalt and previously served as a contractor staging area, while approximately 86% of the remaining site area consists of light underbrush, woodland, and short grass with moderately dense vegetative cover. Based on existing conditions, the site has an overall weighted Curve Number (CN) of 81.7 (**EXHIBIT K**) and an imperviousness of approximately 14% (**EXHIBIT K**). Detailed hydrologic parameters for each delineated subcatchment are provided in **EXHIBIT K**.

Table 1 : Existing outfalls

Outfall Type	Materials	Diameter, inch	Direction*
Culvert	NA**	24	N-W
Culvert		15	N-W
Culvert	CMP	18	N-E
Culvert	CPP	16	E

Culvert	CMP	18	S-E
Culvert	CMP	18	S
Culvert	CMP	18	S
Grate Inlet	CONCRETE	NA**	N-W
Grate Inlet	CONCRETE		E
Curb Inlet	CONCRETE		N-W
** = N=North, S=South, E=East, W=West*			
*** = NA = Not Applicable*			

3.0 PROPOSED IMPROVEMENTS

3.1 PROPOSED DRAINAGE FEATURES

The proposed drainage system is designed to manage runoff generated from parking areas, building roofs (VCC, Gate House, ID Check Canopy), inbound and outbound lanes, and other impervious surfaces (pads, sidewalks etc.). The proposed drainage is delineated into multiple subcatchments based on the land use type and flow paths (**EXHIBIT E**). Stormwater is collected through a network of curb cuts, curb inlets, grate inlets, combination inlets, roof drains, and vegetated swales, and is conveyed via pipes/culverts to the detention pond prior to controlled release to the existing downstream outfalls. System performance is evaluated for the 25-year, 24-hour storm event to ensure the drainage layout operates reliably with no local flooding or adverse ponding. The overall Curve Number and percent imperviousness for the proposed condition are 91.1 (**EXHIBIT K**) and 50.5% (**EXHIBIT K**), respectively.12-inch PVC pipes, along with multiple curb inlets on both the western and eastern sides of the building, convey runoff to either the detention pond or open discharge areas via a 24-inch Reinforced Concrete culvert. Grass lined trapezoidal swales with 4H:1V side slopes are provided along both sides of the outbound road. Several storm drain outfall pipes terminate into these stabilized swales to reduce flow velocity, enhance retention, and manage energy dissipation before water enters the detention pond. The VCC area includes 3×3 ft and 1×1 ft grate inlets to prevent ponding during storm events equal to or exceeding the 25-year, 24-hour rainfall.

Runoff from the gatehouse and search-area canopy is directed as sheet flow toward the gutter system, where combination inlets capture the flow. The detention pond, located on the southern portion of the site, provides staged outflow control to maintain the predevelopment flow condition without flooding the downstream channel. Outlet and inlet protection for pipes and culverts are provided by the headwalls and endwalls. The curb cut ends and outlet protection is reinforced with Flexamat™ Plus to prevent erosion, maintain channel stability, and support peak-flow attenuation during larger storm events.

3.2 DETENTION POND

Despite the presence of HSG-D soils with minimal infiltration capacity, the stormwater design satisfies EISA 438 requirements by implementing DoD-approved runoff reduction measures consistent with UFC 3-210-01. Compliance is achieved through Flexamat™ Plus lined swales, which provide non-erosive, stable conveyance per UFC 3-240-01 and distributed storage, in combination with a detention pond sized to the required initial 20,322.70 cubic feet retention volume at 95th percentile rainfall (**EXHIBIT J**). The pond, configured as shown in Table 2, includes an invert at EL 241, a 1' × 1' bottom orifice limiting maximum outflow to 8.62 cfs at 3.5 feet head, an 18-inch CMP outlet, and a grated weir at EL 243.3 providing overflow control up to EL 244.5. The orifice and grated weir rating curve is determined at 0.1 feet interval shown in **EXHIBIT M.** The system provides 75,395.34 cubic feet of storage at 3.5 ft depth. Together, the lined swales and detention pond replicate predevelopment hydrology through detention, attenuation, and controlled release, fully in accordance with UFC 3-210-01 Section 4-3 allowances for low-permeability soils. Table 2 and 3 shows the overall detention pond configuration and capacity.

Table 2 : Detention Pond System Data

Side Slope	Total Depth (ft)	Riser Dia, D (ft)	Riser Height (ft)	Orifice (inch x inch) at EL 241.80	Open Top Weir Length = **Πd** (ft) at EL 244.3	Outflow Pipe dia (inch)
4H:1V	3.5	4	3.5	12 x 12	12.6	18

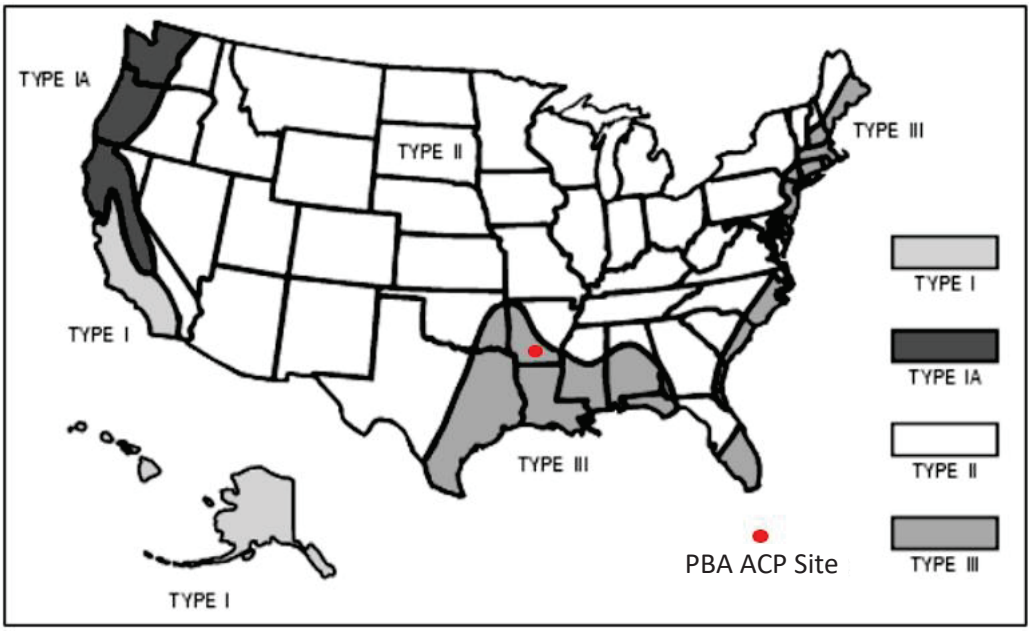
Table 3 : Detention Pond Stage-Area-Storage (Freeboard = 0.5')

Stage (ft)	Elevation (NAVD 88)	Storage Area (square feet)	Volume (cubic feet)
0.0	241.00	18,143.49	-
0.5	241.50	19,099.32	9,310.14
1.0	242.00	20,069.29	19,101.96
1.5	242.50	21,053.41	29,382.21
2.0	243.00	22,051.59	40,158.18
2.5	243.50	23,064.15	51,436.89
3.0	244.00	24,090.65	63,225.09
3.5	244.50	25,121.32	75,395.34

4.0 DATA COLLECTION

4.1 RAINFALL DATA

Rainfall depth for different recurrence intervals is retrieved from the NOAA ATLAS VOLUME 14 which are furnished in **EXHIBIT H**. The rainfall distribution type for this site is SCS Type III under state of Arkansas. The rainfall time series for different recurrence interval is derived for from HEC-HMS model (**EXHIBIT I**). This project area falls under the SCS Type III 24-hr rainfall distribution (see the map below).



4.2 SOIL DATA

Soil data is retrieved from the USDA NRCS Soil Survey data which is furnished in **EXHIBIT F**. According to the NRCS soil survey, the project site is composed predominantly of dual hydrologic soil group C/D soils, representing approximately 96.8% of the area, with the remaining 3.2% classified as Group D. In the absence of documented drainage improvements, the C/D soils should be evaluated as Hydrologic Soil Group D for rainfall-runoff analyses.

4.3 TOPOGRAPHIC SURVEY DATA

Topographic Survey is conducted by Halff (**EXHIBIT D**). The hydrologic analysis for existing condition is conducted based on this topographic survey data.

4.4 LAND COVER DATA

The land cover data for existing site is extracted based on the satellite imagery and topographic survey data to separate the impervious areas from pervious areas. The cover classification is performed accordingly to assign the curve number and overland flow Manning's N. However, the land cover classification

for proposed condition is derived from the proposed site layout based on the revised corridor and alignment for this site. Land use types in the existing and proposed condition for each delineated subcatchments are defined in the **EXHIBIT C AND EXHIBIT E,** respectively.

5.0 METHODS OF ANALYSIS

In accordance with the guidelines specified in UFC 3-210-10: Low Impact Development (LID), we utilized the approved methodologies outlined in Section 3-1.1. The hydrologic and hydraulic analyses were performed using the United States Environmental Protection Agency's (USEPA) Storm Water Management Model (SWMM) and the United States Army Corps of Engineers' (USACE) Hydrologic Engineering Center Hydrologic Modeling System (HEC-HMS) as per UFC 3-210-01(Hydrology and Hydraulics). The modeling procedures employed to simulate the rainfall-runoff processes are discussed in detail below:

5.1 HYDROLOGIC & HYDRAULIC ANALYSIS (DRAINAGE SYSTEM)

5.1.1 USACE - HEC-HMS MODELING:

HEC-HMS is used to simulate watershed hydrology and generate precipitation–runoff responses for flood and drainage analysis. For this project, HEC-HMS was applied to develop 15-minute rainfall time series using the SCS Type III distribution. Design rainfall depths for the 24-hour duration and corresponding recurrence intervals were obtained from NOAA Atlas 14, Volume 14, and were transformed into temporal hyetographs for use as rainfall inputs in the SWMM model. (**EXHIBIT I)**

5.1.2 USEPA-SWMM (STORMWATER MANAGEMENT MODEL)

SWMM is a rainfall-runoff simulation modeling tool primarily sensitive to the rainfall input used to generate runoff and convey that runoff through a drainage system. Building upon the rainfall data developed in the HEC-HMS model, SWMM was employed to perform detailed hydraulic flow routing through the proposed storm drain network. Subcatchments were delineated in Civil 3D based on surface flow paths and proposed grading, assigning each inlet as a pour point (**EXHIBIT E**). These subcatchments, along with the rainfall time series, were replicated within the SWMM model, where hydrologic characteristics such as imperviousness, surface roughness, depression storage, and curve number were defined for each drainage area (**EXHIBIT K**). We used dynamic wave routing to accurately capture backwater effects, pressurized flow, and hydraulic interactions within the stormwater system. We applied the NRCS Curve Number method to represent infiltration using land cover and soil conditions consistent with accepted hydrologic practice. Together, these approaches provide a reliable and physically realistic simulation of runoff generation and flow routing. The hydraulic elements-including curb inlets, grate inlets, swales, pipes, and the detention pond

outlet structure were modeled in accordance with the DBRF submittal. The model hydrologic and hydraulic parameters for each subcatchment in pre-and-post-development conditions are derived from the recognized source which are tabulated in **EXHIBIT O**. Those parameter values are used for each subcatchment to accurately represent the hydrological condition for each delineated subcatchments. The model parameter values are listed in **EXHIBIT K.** The curb cut dimension and splash pad design to accommodate the peak runoff are shown in the **EXHIBIT M.** We applied dampened inertial terms to enhance numerical stability while preserving realistic momentum effects during rapidly varying flow conditions. We use the Slope & Froude normal flow criterion, Hazen-Williams force main equation, and the EXTRAN surcharge method to accurately represent gravity flow, pressurized conveyance, and surcharged system behavior under peak storm events. Multiple simulation runs were performed for the 95th-percentile rainfall event and the 10-, 25-, 50-, and 100-year 24-hour design storms at 15-min time interval. Model performance was evaluated using SWMM's continuity error metrics for both surface runoff and hydraulic routing, ensuring stability across all events. The 25-year 24-hour and 100-year-24 hour continuous event for predevelopment and postdevelopment condition are used to assess system-wide flow routing and confirm that conduits and swales velocities remain below the 5-fps maximum velocity requirement outlined in UFC 3-240-01 and UFC 3-210-01 (**EXHIBIT L & EXHIBIT N**). The 100-year 24-hour storm was used to evaluate the upper limit of system capacity, hydraulic grade lines, and water surface elevations across the network. The roof drainage connection to the header pipes through the downspout from VCC, Gatehouse, Truck Search Canopy, and ID Check canopy are incorporated based on the contributing roof area derived from architectural drawings. The roof area for each downspout and corresponding roof width are used in the SWMM model to capture the impact of roof runoff (**EXHIBIT P**). The adverse impact due to postdevelopment flow is mitigated by limiting the flow up to 10.24 cfs which is well below the predevelopment flow during 100-year storm event. The maximum water depth due to 10.24 cfs flow is 1 foot in the 2 feet deep channel. The SWMM model generated water surface profile is shown to demonstrate the no adverse impact in the **EXHIBIT Q**.

Overall, the SWMM model demonstrates that the proposed stormwater management system-including the detention pond, inlets, swales, and underground conduits provides effective peak-flow attenuation and UFC-compliant hydraulic performance across all design storms. For the 10-, 25-, 50-, and 100-year events, maximum pond outflow is limited to approximately 10.24 cfs, consistent with peak-flow control guidance in UFC 3-210-01, while detention depths remain below 4 ft, maintaining roughly 0.5 ft of freeboard. The 95th-percentile storm remains fully orifice-controlled with no weir activation, aligning with small-storm retention and water-quality objectives under UFC 3-210-01. These results confirm that the system maintains acceptable velocities, safe

hydraulic grade lines, and adequate storage capacity while meeting all applicable UFC stormwater drainage and performance criteria.

6.0 EROSION AND SEDIMENT CONTROL

The area of disturbance due to construction activities will be enclosed with silt fencing to prevent the sediment discharge out of the disturbed area. Inlet protection will be provided around the existing inlets from sediment intrusion. The detention pond should be installed prior to demolition/ clearing/grubbing to utilize the pond as the sediment control measure. Reserve at least 75 % of the permanent detention volume for runoff attenuation, and dedicate the remaining 25 % (or more, if high sediment loads are expected) as a sediment storage zone (i.e., forebay) below the permanent outlet elevation. A forebay should be installed at the pond inlet (minimum 10 % of the total basin volume) to intercept coarse sediments. Grade the forebay bottom to a gentle slope toward the dewatering structure to facilitate clean-out. Replace or retrofit the permanent riser with a dewatering device (e.g., a riser with slide gate and calibrated orifice) set at the pre-development EL to draw down the basin within 48 hours after a storm, per UFC 3-210-10 §2-4. Line the sides and bottom of the sediment storage zone with Flexamat™ Plus to prevent rill erosion as sediment accumulates. Inspect weekly and within 24 hours of any rainfall > 0.5 in; remove accumulated sediment when it reaches 50 % of the storage depth. After final site grading and permanent seeding (> 70 % cover), remove temporary forebay structures and reset the pond to its permanent detention configuration. By temporarily reallocating a portion of the permanent pond's volume and outfitting it with the proper forebay, outlet control, and access for clean-out, both USACE EM 1110-2-1901 sediment-trap requirements and UFC 3-210-10 temporary sediment basin criteria will be satisfied without constructing a separate facility.

7.0 RESULTS AND DISCUSSION

As shown in Table 4, untreated post-development peak flows would substantially exceed predevelopment conditions for all storm events, with increases ranging from approximately 37.9 – 75.4% for the major design storms. The proposed detention pond successfully offsets these increases by reducing outflow to 6 to 10 cfs for the 10-, 25-, 50-, and 100-year storms, consistent with the peak-flow attenuation requirements outlined in UFC 3-210-01. These controlled discharge rates are lower than predevelopment peak flows in every case, demonstrating that the detention system restores post-development hydrologic performance to below existing conditions in compliance with UFC 3-210-01 stormwater management criteria. The total peak inflow in the Outfall 1, Outfall 2, and Outfall 4 are summed up to find the peak flow in pre-development period from SWMM model in **EXHIBIT L.** The total peak inflow in the detention pond from the whole drainage area is taken as the post-development peak flow from the SWMM model in **EXHIBIT N.** Those peak flows for multiple storm events are tabulated in Table 4.

Table 4 : Peak Flow Summary (Predevelopment vs Post development and Control)

Event	Predevelopment Peak Flow (cfs)	Postdevelopment Peak Flow (cfs)	Detention Pond Outflow to Outfall (cfs)
2-year-24 Hr	7.2	20.14	6.14
5-year-24 Hr	10.64	25.92	8.34
10-year-24 Hr	13.68	30.62	9.26
25-year-24 Hr	18.27	32.25	9.76
50-year-24 Hr	21.98	35.86	10.20
100-year-24 Hr	26.25	38.89	10.24

The detention pond demonstrates consistent and effective flow attenuation across all modeled storm events, as summarized in Table 5. No weir activation occurs, indicating that the low-flow outlet functions as intended for water quality and frequent storm management in accordance with UFC 3-210-01 guidance for small event control. For the 10-, 25-, 50-, and 100-year, 24-hour storms, the pond reaches depths between 2.99 ft and 3.50 ft, corresponding to 85 - 100% storage utilization. Although peak inflows increase from 20 cfs to 39 cfs for the storm return period 2-year to 100 year, the pond effectively limits outflow to 6.14 to 10.24 cfs, demonstrating proper staged outlet control consistent with UFC 3-210-01 stormwater detention performance criteria. During larger events, the grated weir on top of the riser conveys 0.58 cfs-27.24 cfs, while orifice flow remains stable at approximately 0.10 cfs to 8.62 cfs for the depth of water 0.1 to 3.5 feet. The downstream 18-inch CMP, which meets the minimum storm drain pipe size requirements in UFC 3-240-01, further regulates discharge to maintain the controlled 10.24 cfs peak release.

Overall, the detention pond performs as intended by capping post-development peak flows, preserving required freeboard, and maintaining safe hydraulic behavior under all design storms. The results confirm that the proposed stormwater system meets UFC 3-210-01 objectives for peak-flow reduction, UFC 3-240-01 criteria for conveyance capacity, and overall storm event resilience.

Table 5 : Detention Pond Summary

Event	Max Depth (ft)	Max Inflow (cfs)	Max Outflow (cfs)	Peak Attenuation Ratio (Qout/Qin)	Storage Utilization (%) (Depth/3.5)	Max Volume (cf)
2-Year, 24 Hr	2.02	20.14	6.14	0.30	57	40,603.44
5-Year, 24 Hr	2.55	25.92	8.34	0.32	72	52,584.55
10-Year, 24-Hr	2.99	30.62	9.26	0.30	85	63,091.67

25-Year, 24-Hr	3.42	32.25	9.76	0.30	97.8	73,555.61
50-Year, 24-Hr	3.44	35.86	10.20	0.28	98.2	74,028.35
100-Year, 24-Hr	3.50	38.89	10.24	0.26	100	75,338.94

8.0 CONCLUSION

The SWMM simulations for existing and proposed conditions demonstrate that the designed stormwater system and detention facility provide strong hydraulic performance across all events. Continuity errors for surface runoff (0.18%) and flow routing (2.17%) (100-year-24-hour) simulation is well within acceptable limits, confirming mass balance is adequately conserved and results are hydraulically reliable. Although post-development peak flows increase to 20.14 – 38.89 cfs, the detention pond effectively attenuates runoff, regulating outflow to 6.14 cfs -10.24 cfs through combined weir and orifice control. Storage depths remain within 2.02 - 3.50 ft, with volumes up to 75,338.94 cubic feet, confirming adequate capacity under 2-year to 100-year storms. Overall, the system reduces downstream peaks below pre-development levels and meets all stormwater management criteria with robust reliability.

EXHIBITS

1. EXHIBIT A: PBA ACP PROJECT LOCATION MAP.
2. EXHIBIT B: FEMA FIRMETTE_NFHL _PBA ACP (MAP NO. 05069C0165D).
3. EXHIBIT C: SUBCATCHMENT AREA DELINEATION AND FLOW LENGTH (EXISTING).
4. EXHIBIT D: EXISTING OUTFALL LOCATIONS.
5. EXHIBIT E: SUBCATCHMENT AREA DELINEATION AND FLOW LENGTH (PROPOSED).
6. EXHIBIT F: USDA NRCS SOIL SURVEY MAP.
7. EXHIBIT G: 95TH PERCENTILE RAINFALL.
8. EXHIBIT H: NOAA ATLAS VOLUME-14 DESIGN RAINFALL DEPTH.
9. EXHIBIT I: RAINFALL TIME SERIES FROM HEC-HMS MODEL.
10. EXHIBIT J: ESIA 438 AND DETENTION POND REQUIREMENT CALCULATION (PRE-VS-POST-DEVELOPMENT)
11. EXHIBIT K: HYDROLOGIC INPUT PARAMETERS AND VALUES (SWMM INPUT) (PRE-AND POST-DEVELOPMENT).
12. EXHIBIT L: SWMM 25-YR-24-HR & 100-YR-24-HR SIMULATION OUTPUT VISUALIZATION (PREDEVELOPMENT).
13. EXHIBIT M: DESIGN CALCULATION FOR CURB CUT, SPLASH PAD, & INLET RISER SYSTEM (SWMM INPUT).
14. EXHIBIT N: SWMM 25-YR-24-HR & 100-YR-24-HR SIMULATION OUTPUT VISUALIZATION(POSTDEVELOPMENT)
15. EXHIBIT O: HYDROLOGIC AND HYDRAULIC PARAMETER REFERENCES USED IN THE MODELING AND ANALYSIS.
16. EXHIBIT P: EXHIBIT P - ROOF DRAINAGE AREA AND WIDTH FROM ARCHITECTURAL DRAWING (SWMM INPUT).
17. EXHIBIT Q: 100-YEAR WATER SURFACE PROFILE IN THE EXISTING OUTFALL IMMIEDIATE DOWNSTREAM OF THE POND OUTLET PIPE

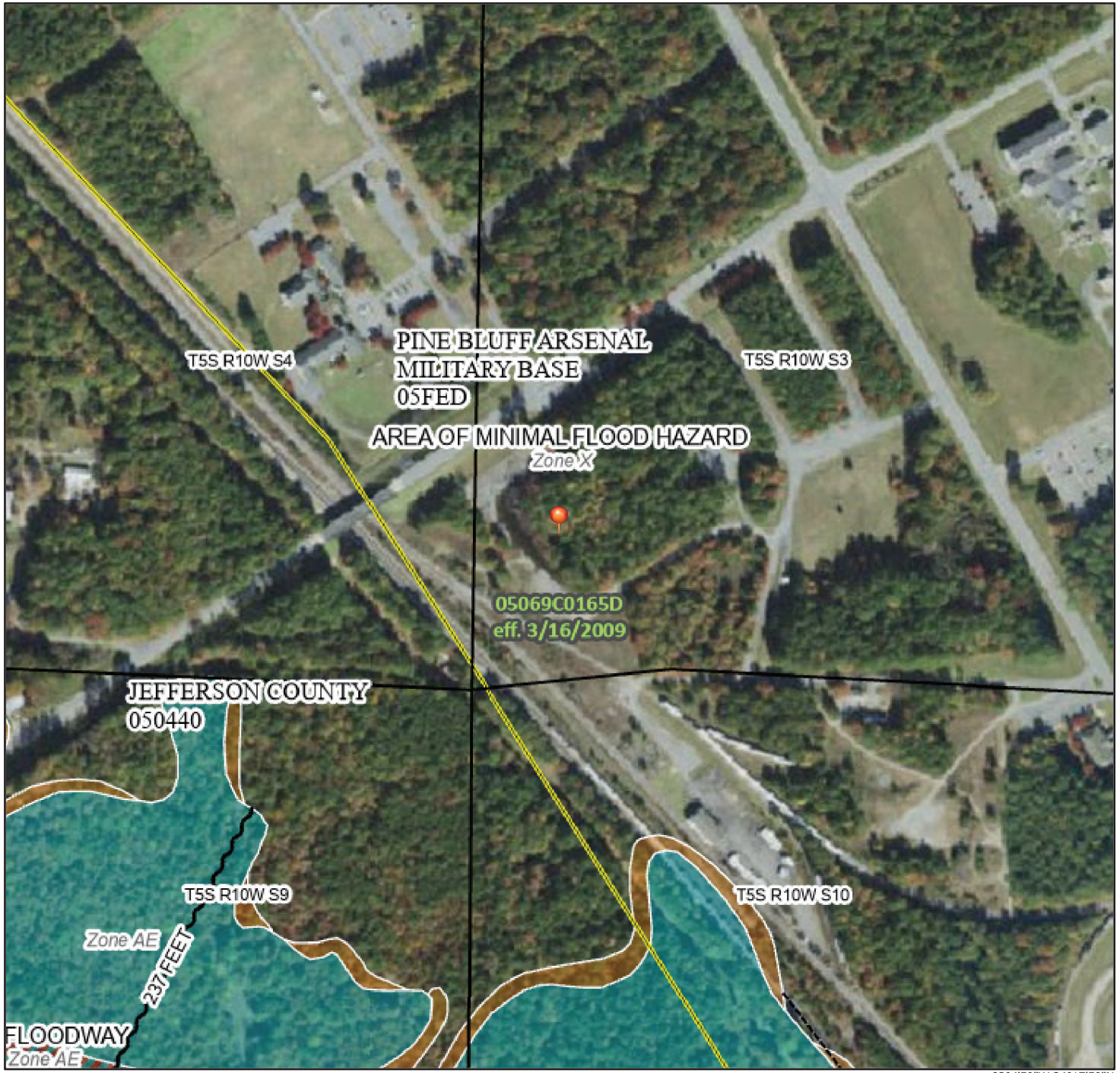
PINE BLUFF ARSENAL ACP PROJECT LOCATION

EXHIBIT B- FEMA FIRMETTE_NFHL _PBA ACP

National Flood Hazard Layer FIRMette

FEMA

92°5'27"W 34°18'19"N



92°4'50"W 34°17'50"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

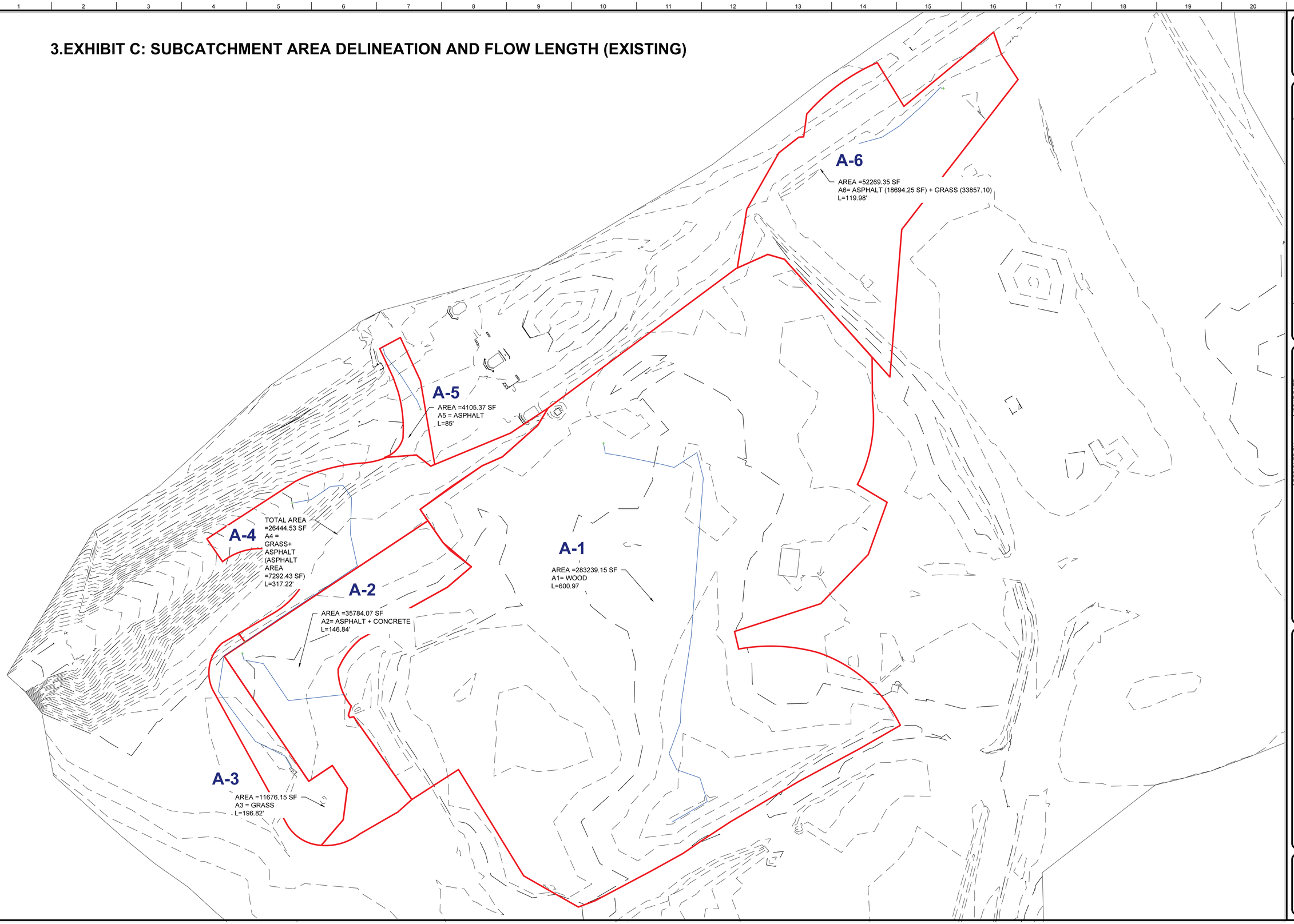
The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/8/2025 at 10:04 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

3.EXHIBIT C: SUBCATCHMENT AREA DELINEATION AND FLOW LENGTH (EXISTING)



US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY:	ISSUE DATE:
B.BANDA	09/30/2024
DRAWN BY:	SOLICITATION NO.:
R.ISLAM	TBD
CHECKED BY:	CONTRACT NO.:
R.TOLIKONDA	W912T5223D0035
SUBMITTED BY:	FILE NUMBER:
R.TOLIKONDA	
SIZE:	
ANSI FULL BLEED D (22.00 X 34.00 INCHES)	

U.S. ARMY CORPS OF ENGINEERS

PINE BLUFF ARSENAL PLAINVIEW GATE

HANA-KENALL 8A JV
2500 CITYWEST BLVD, STE 700
HOUSTON, TX 77042

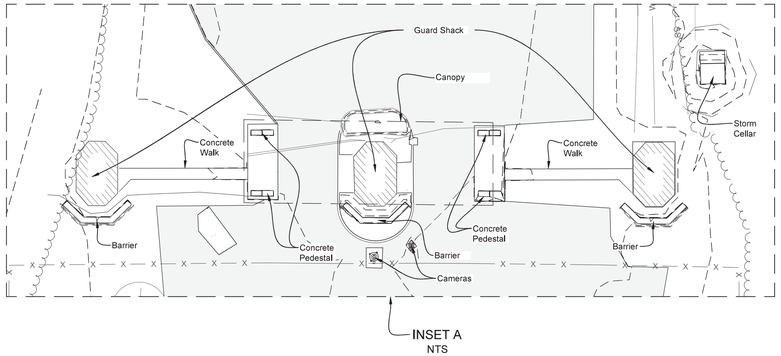
PINE BLUFF ARSENAL PLAINVIEW GATE
HOADLEY ROAD, WHITE HALL, AR 71602

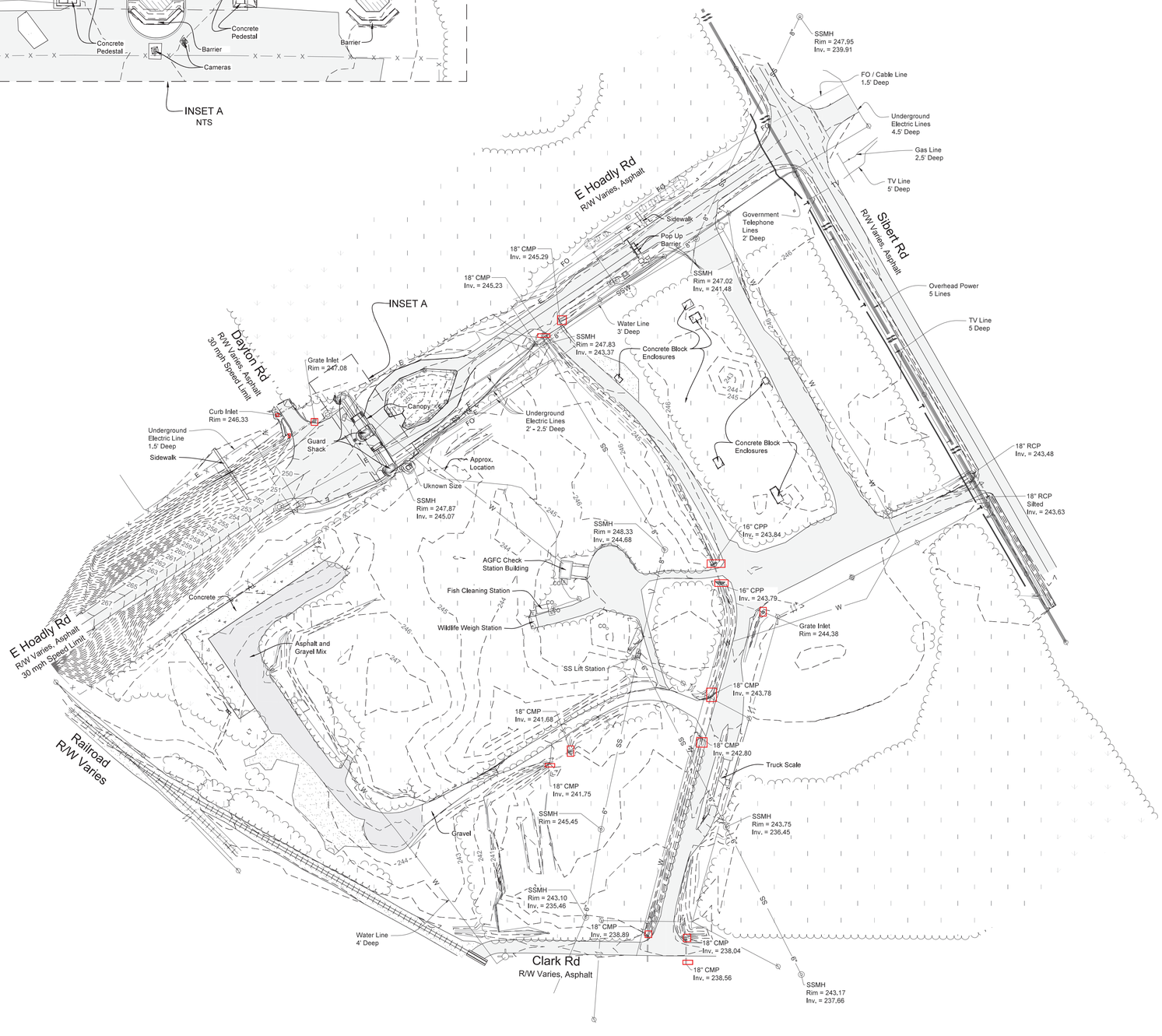
EXISTING CATCHMENT AREA

SCALE 1"= 50'

SHEET ID

EXHIBIT D: EXISTING OUTFALL LOCATIONS





GRAPHIC SCALE
0 50 100 200
1"=100'

LEGEND

- Boundary Line
- Lot Line
- Building
- Building Overhang
- Buried Electric Line
- Overhead Electric
- Telephone Cable
- Fiber Optic Cable
- Gas Line
- Sanitary Sewer
- Storm Sewer
- Waterline
- Barb Wire Fence
- Pavement Line
- Concrete Curb
- Gutter
- Flow Line Creek
- Right-of-way Line
- Center Line Of Road
- Asphalt
- Concrete
- Gravel
- Landscaping
- Tree Line and Woods
- Vault (as Noted)
- Manhole (as noted)
- Sanitary Sewer Cleanout
- Electric Meter
- Electric Pedestal
- Electric Transformer
- Fiber Optic Pedestal
- Television Pedestal
- Telephone Pedestal
- Sign (as noted)
- Tree
- Bush
- Traffic Light Pole
- Fire Hydrant
- Water Meter
- Water Valve
- Irrigation Control Valve
- Gas Pipeline Sign
- Gas Meter
- Gas Riser or Service
- Gas Vent Pipe
- Gas Vent Pipe
- Guy Wire
- Light Pole
- Light Pole W/ Pedestal
- Power Pole
- Power Pole With Transformer
- Power Pole With Light
- Mailbox

GENERAL NOTES:

- Vertical Datum: NAVD88 Vertical Datum: NAVD88 (Geoid 18). Orthometric heights and contours are derived from Terrestrial and RT Kinematics GNSS Observations based on OPUS processed solution having an orthometric height of: 74.49 m/ 244.398 feet.
- Flood Information: Based upon review of NFIP FIRM, City of Pine Bluff, Jefferson County, Arkansas, Map Number 05069C0165D, Map Effective: March 16, 2009, and by graphic plotting only, the subject property lies within: Zone X, areas determined to be outside the 0.2% annual chance floodplain. Surveyor assumes no liability for the correctness of cited map.
- Existing utilities shown hereon were located by reasonable visual observed surface improvements and the painted markings per the Arkansas One Call Utility Locate System; Ticket Number 240531-1934, unless noted otherwise. Actual locations of utilities shown, or the existence of additional subsurface improvements not shown hereon, should be verified before any excavations. Locations or existence of surface or subsurface improvements may differ from those shown hereon.
- Contour intervals are one-foot, as depicted hereon.
- Last Date of Field Survey: June 6, 2024.

Design of Plainview Pine Bluff Arsenal
TASK ORDER NUMBER: 8114

Jefferson County, Arkansas

halff
5704 EUPER LN, SUITE 200
FORT SMITH, ARKANSAS 72903
TEL. (479) 452-1933

No.	DATE	REVISION DESCRIPTION

TOPOGRAPHIC SURVEY MAP

PROJECT NO: 53632.002
ISSUED: 7/31/2024
DRAWN BY: PWH
CHECKED BY: DWM

SHEET TITLE:
SUE Exhibit

V-101

PAGE: 1 OF 1

EXHIBIT E - SUBCATCHMENT AREA DELINEATION AND FLOW LENGTH (PROPOSED)

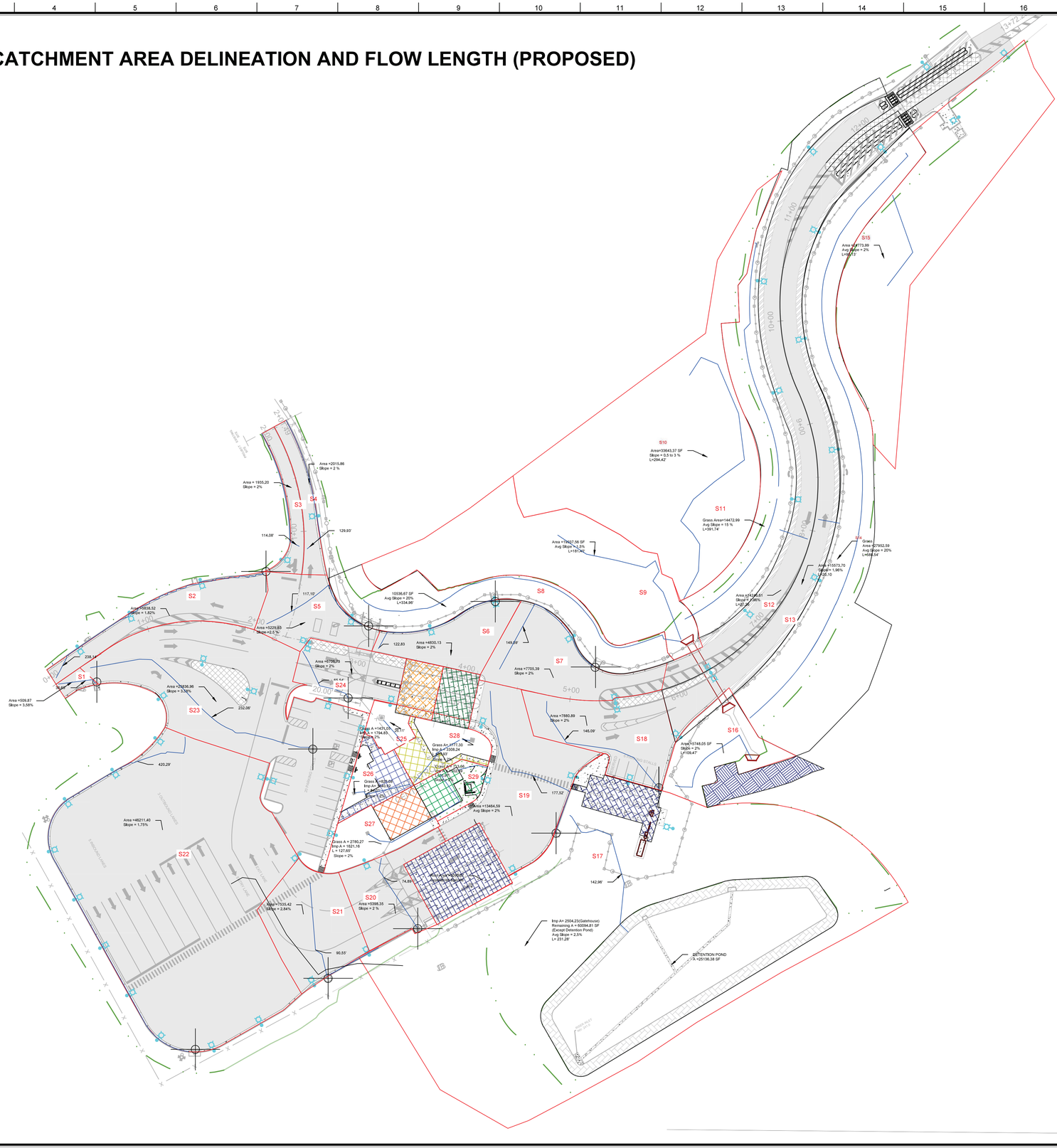

S1
S2
S3
S4
S5
S6
S7
S8
S9
S10
S11
S12
S13
S14
S15
S16
S17
S18
S19
S20
S21
S22
S23
S24
S25
S26
S27
S28
S29
Area =509.87 Slope = 3.58%
Area =25836.96 Slope = 3.58%
Area =3836.52 Slope = 1.82%
Area =3229.83 Slope =2.5 %
Area =1935.20 Slope = 2%
Area =2015.86 Slope = 2 %
Area =6706.73 Slope = 2%
Area =4830.13 Slope = 2%
Area =7705.39 Slope = 2%
Area =7880.89 Slope = 2%
Area =5748.05 SF Slope = 2% L=109.47
Area =13464.59 Avg Slope = 2%
Area =46211.40 Slope = 1.75%
Area =7535.42 Slope = 2.64%
Area =5398.35 Slope = 2 %
Area =35643.37 SF Slope = 0.3 to 3 % L=294.42'
Area =79927.56 SF Avg Slope = 2.5% L=181.40'
Grass Area=14472.99 Avg Slope = 15 % L=391.74'
Grass Area=27952.59 Avg Slope = 20% L=68.54'
Area =11573.70 Slope = 1.96% L=105.55'
Area =14246.81 Slope = 1.96% L=20.28'
Area =5773.99 Avg Slope = 2% L=47.2'
10536.67 SF Avg Slope = 20% L=334.90'
Grass A = 2780.27 Imp A = 1621.16 L = 127.65' Slope = 2%
Imp A= 2504.23(Gatehouse) Remaining A = 60094.81 SF (Except Detention Pond) Avg Slope = 2.5% L= 231.28'
DETENTION POND = 25136.38 SF
Grass A=1717.20 Imp A=3308.24 Slope = 2% L=120.00' Grass A=1717.20 Imp A=3308.24 Slope = 2% L=120.00'
Area =1429.05 L=54.5 = 1784.83 Slope=2%
Grass A=2626.66 Imp A=3863.52 Slope = 2%
Area =2830.52 Slope = 2%
Area =4306.52 Slope = 2%
Area =1573.99 Avg Slope = 2% L=47.2'
Area =1573.70 Slope = 1.96% L=105.55'
Area =14246.81 Slope = 1.96% L=20.28'
Grass Area=27952.59 Avg Slope = 20% L=68.54'
Grass Area=14472.99 Avg Slope = 15 % L=391.74'
Area =79927.56 SF Avg Slope = 2.5% L=181.40

EXHIBIT F: USDA NRCS SOIL SURVEY MAP

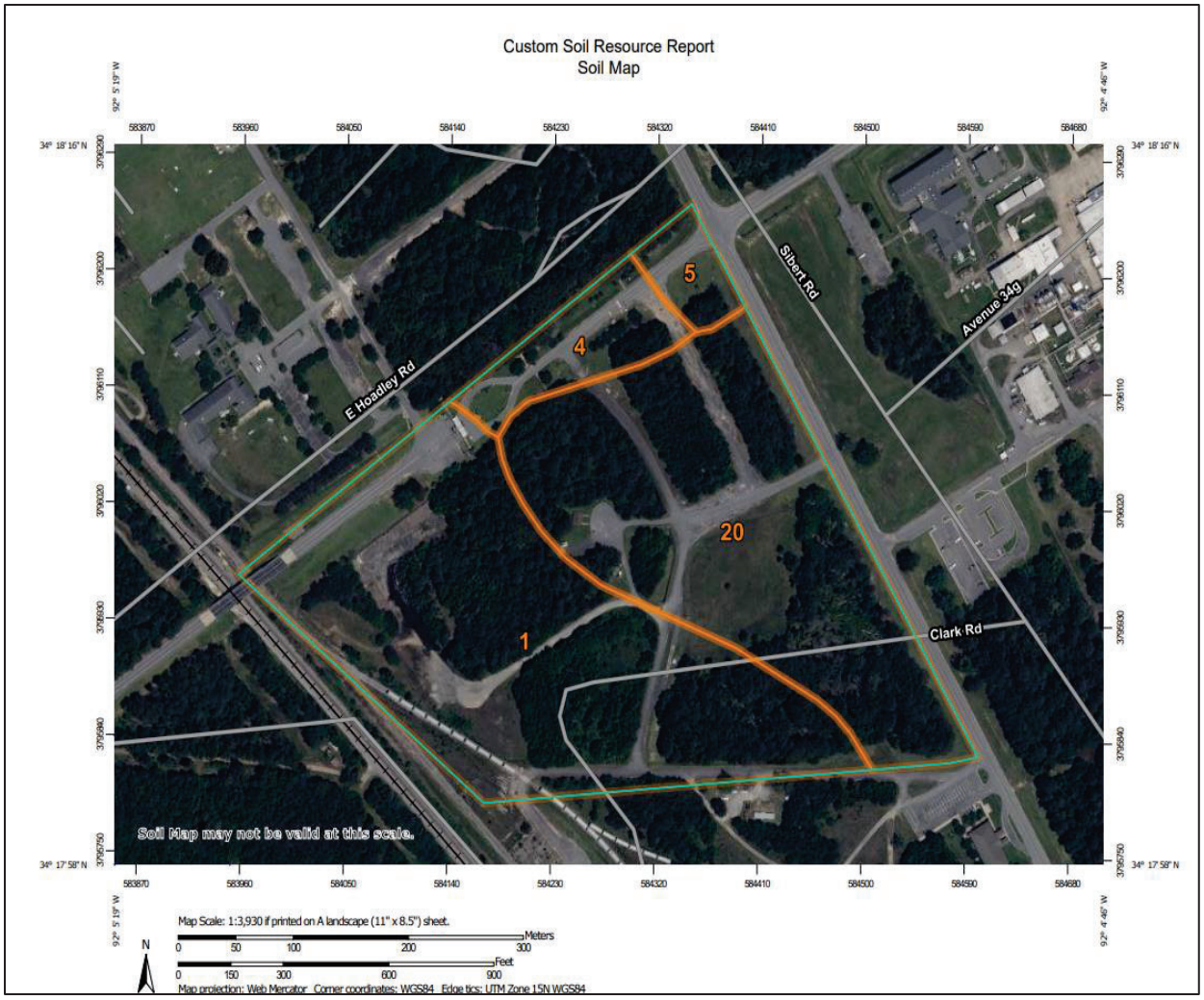


Figure A-2: Soil Survey Map for Pine Bluff Arsenal Project *(Source: USDA, NRCS)*

Table A-1: Soil Types and Corresponding Hydrologic Groups within the Area of Interest

Map Unit Symbol	Map Unit Name	Area of Interest (AOI) (ac)	Percent of AOI	Hydrologic Soil Group
1	Amy Silt Loam, 0 -1% slopes	19.7	48.9%	C/D
4	Calloway Silt Loam, 0 – 1% slopes	2.8	6.9%	C/D
5	Calloway Silt Loam, 1-3% slopes	1.3	3.1%	D
20	Henry Silt Loam	16.5	41.1.%	C/D
Totals for AOI		40.3	100.0%	

EXHIBIT G: 95TH PERCENTILE RAINFALL

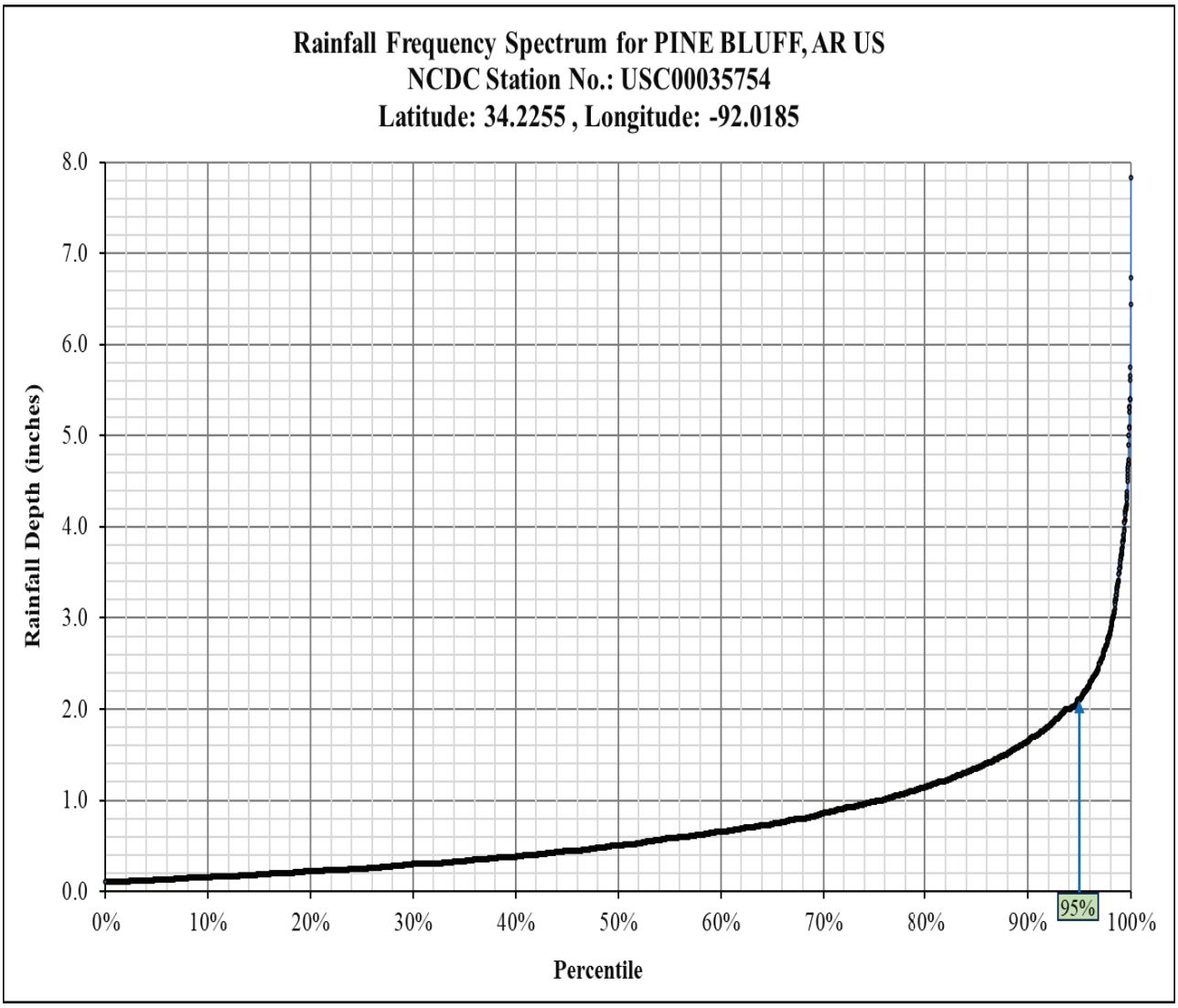


EXHIBIT H: NOAA ATLAS VOLUME-14 DESIGN RAINFALL DEPTH

NOAA Atlas 14, Volume 9, Version 2
Location name: White Hall, Arkansas, USA*
Latitude: 34.3017°, Longitude: -92.0851°
Elevation: 245 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.444 (0.383-0.521)	0.504 (0.434-0.590)	0.598 (0.514-0.703)	0.674 (0.577-0.794)	0.775 (0.643-0.928)	0.851 (0.694-1.03)	0.924 (0.732-1.14)	0.995 (0.763-1.25)	1.09 (0.806-1.39)	1.15 (0.839-1.50)
10-min	0.650 (0.561-0.762)	0.737 (0.636-0.865)	0.876 (0.753-1.03)	0.987 (0.845-1.16)	1.14 (0.942-1.36)	1.25 (1.02-1.51)	1.35 (1.07-1.66)	1.46 (1.12-1.83)	1.59 (1.18-2.04)	1.69 (1.23-2.19)
15-min	0.793 (0.685-0.930)	0.899 (0.775-1.05)	1.07 (0.918-1.26)	1.20 (1.03-1.42)	1.38 (1.15-1.66)	1.52 (1.24-1.84)	1.65 (1.31-2.03)	1.78 (1.36-2.23)	1.94 (1.44-2.48)	2.06 (1.50-2.67)
30-min	1.19 (1.03-1.39)	1.35 (1.17-1.58)	1.61 (1.38-1.89)	1.82 (1.55-2.14)	2.09 (1.73-2.50)	2.29 (1.86-2.77)	2.48 (1.97-3.05)	2.67 (2.05-3.35)	2.91 (2.16-3.72)	3.08 (2.24-4.00)
60-min	1.58 (1.37-1.86)	1.80 (1.55-2.11)	2.14 (1.84-2.52)	2.42 (2.07-2.85)	2.80 (2.33-3.36)	3.08 (2.52-3.74)	3.36 (2.67-4.14)	3.64 (2.79-4.57)	4.00 (2.97-5.12)	4.26 (3.10-5.54)
2-hr	1.98 (1.72-2.30)	2.24 (1.95-2.61)	2.68 (2.31-3.12)	3.03 (2.61-3.55)	3.51 (2.94-4.19)	3.88 (3.19-4.67)	4.24 (3.39-5.20)	4.61 (3.56-5.76)	5.09 (3.80-6.48)	5.44 (3.99-7.03)
3-hr	2.22 (1.93-2.57)	2.52 (2.19-2.92)	3.01 (2.61-3.50)	3.42 (2.95-3.99)	3.99 (3.35-4.75)	4.43 (3.65-5.32)	4.87 (3.90-5.95)	5.32 (4.12-6.62)	5.91 (4.44-7.51)	6.36 (4.68-8.18)
6-hr	2.66 (2.33-3.07)	3.04 (2.66-3.51)	3.67 (3.20-4.24)	4.20 (3.65-4.87)	4.95 (4.19-5.86)	5.54 (4.60-6.62)	6.13 (4.95-7.46)	6.75 (5.27-8.37)	7.58 (5.74-9.58)	8.22 (6.09-10.5)
12-hr	3.17 (2.79-3.62)	3.66 (3.21-4.18)	4.47 (3.92-5.12)	5.15 (4.50-5.92)	6.12 (5.21-7.21)	6.88 (5.75-8.18)	7.66 (6.23-9.27)	8.47 (6.66-10.4)	9.56 (7.28-12.0)	10.4 (7.76-13.2)
24-hr	3.74 (3.31-4.25)	4.33 (3.83-4.92)	5.31 (4.68-6.05)	6.15 (5.40-7.02)	7.33 (6.28-8.58)	8.26 (6.94-9.76)	9.22 (7.54-11.1)	10.2 (8.08-12.5)	11.5 (8.86-14.4)	12.6 (9.44-15.9)
2-day	4.38 (3.90-4.94)	5.04 (4.48-5.69)	6.15 (5.45-6.95)	7.09 (6.26-8.04)	8.43 (7.26-9.80)	9.49 (8.02-11.1)	10.6 (8.70-12.6)	11.7 (9.32-14.2)	13.2 (10.2-16.4)	14.4 (10.9-18.1)
3-day	4.80 (4.28-5.38)	5.50 (4.90-6.18)	6.67 (5.93-7.51)	7.67 (6.79-8.66)	9.08 (7.85-10.5)	10.2 (8.65-11.9)	11.3 (9.37-13.5)	12.5 (10.0-15.2)	14.1 (11.0-17.5)	15.4 (11.7-19.2)
4-day	5.13 (4.59-5.74)	5.86 (5.24-6.57)	7.09 (6.32-7.95)	8.13 (7.21-9.15)	9.60 (8.31-11.1)	10.8 (9.14-12.5)	11.9 (9.88-14.1)	13.2 (10.5-15.9)	14.8 (11.5-18.2)	16.1 (12.2-20.0)
7-day	5.96 (5.36-6.64)	6.76 (6.07-7.53)	8.10 (7.25-9.04)	9.23 (8.23-10.3)	10.8 (9.41-12.4)	12.1 (10.3-14.0)	13.4 (11.1-15.7)	14.7 (11.8-17.6)	16.4 (12.8-20.1)	17.8 (13.6-22.0)
10-day	6.74 (6.07-7.47)	7.59 (6.83-8.42)	9.00 (8.08-10.0)	10.2 (9.10-11.4)	11.8 (10.3-13.5)	13.2 (11.3-15.1)	14.5 (12.1-17.0)	15.8 (12.8-18.9)	17.7 (13.8-21.5)	19.1 (14.6-23.5)
20-day	9.10 (8.24-10.0)	10.1 (9.12-11.1)	11.7 (10.5-12.9)	13.0 (11.7-14.4)	14.8 (13.0-16.7)	16.2 (13.9-18.5)	17.6 (14.7-20.4)	19.0 (15.4-22.5)	20.8 (16.4-25.1)	22.2 (17.1-27.2)
30-day	11.0 (10.0-12.1)	12.2 (11.1-13.4)	14.0 (12.7-15.4)	15.5 (14.0-17.1)	17.5 (15.4-19.7)	19.0 (16.4-21.6)	20.5 (17.3-23.7)	22.0 (17.9-25.9)	23.9 (18.9-28.7)	25.3 (19.6-30.8)
45-day	13.4 (12.2-14.6)	14.8 (13.5-16.2)	17.1 (15.6-18.7)	18.9 (17.1-20.8)	21.3 (18.8-23.8)	23.1 (20.0-26.0)	24.8 (20.9-28.4)	26.4 (21.6-30.9)	28.5 (22.6-34.0)	30.0 (23.3-36.4)
60-day	15.4 (14.1-16.7)	17.1 (15.6-18.6)	19.8 (18.1-21.7)	22.0 (20.0-24.1)	24.8 (21.9-27.6)	26.9 (23.3-30.2)	28.8 (24.3-32.9)	30.7 (25.1-35.8)	33.0 (26.2-39.2)	34.6 (27.0-41.9)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

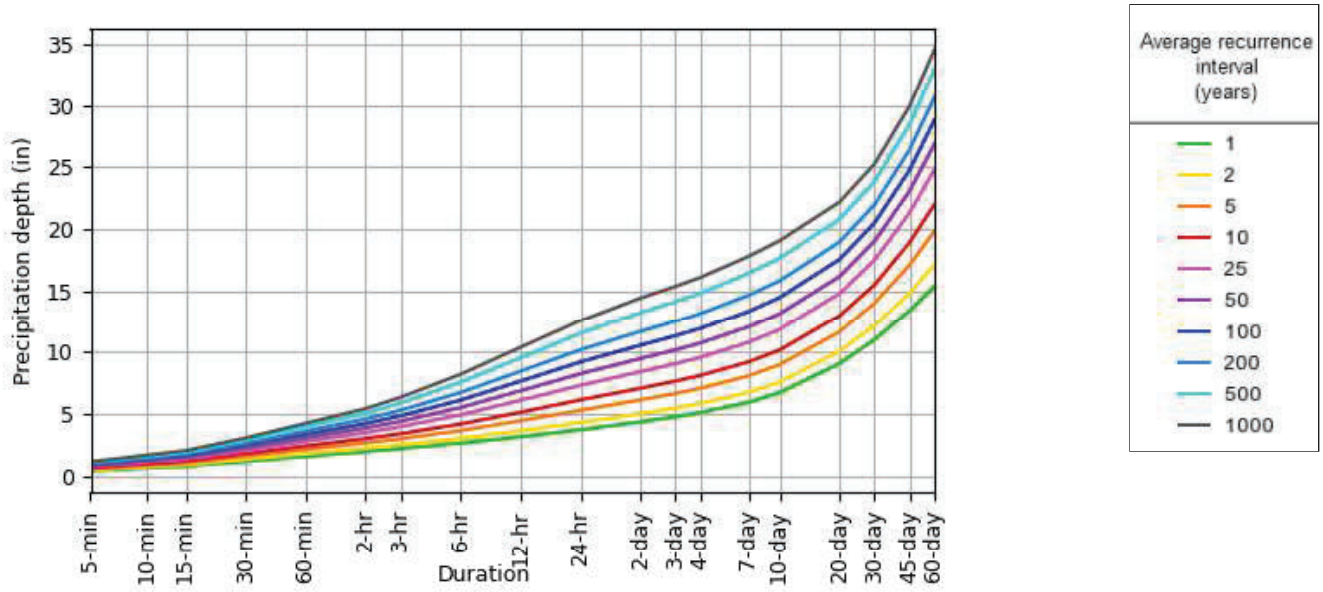
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

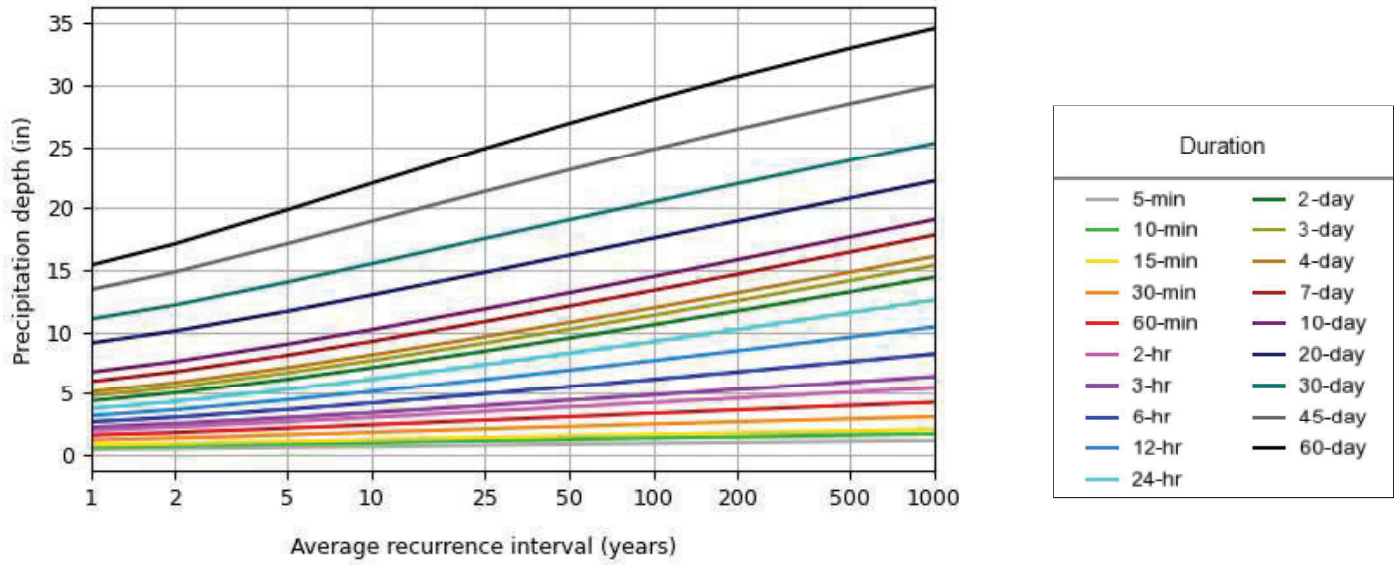
Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 34.3017°, Longitude: -92.0851°





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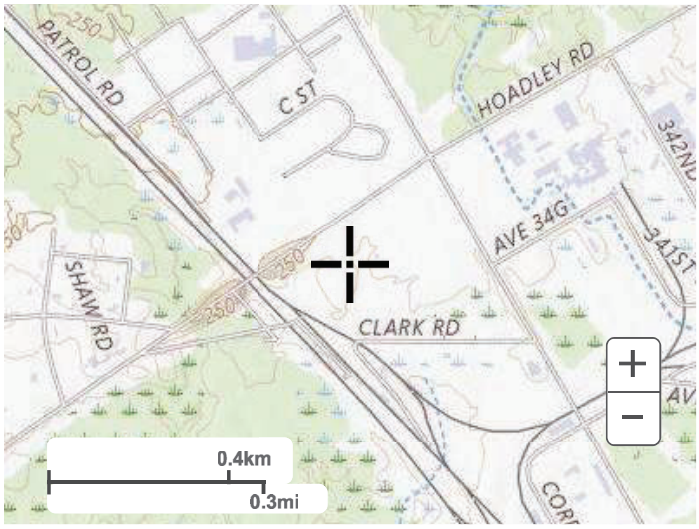
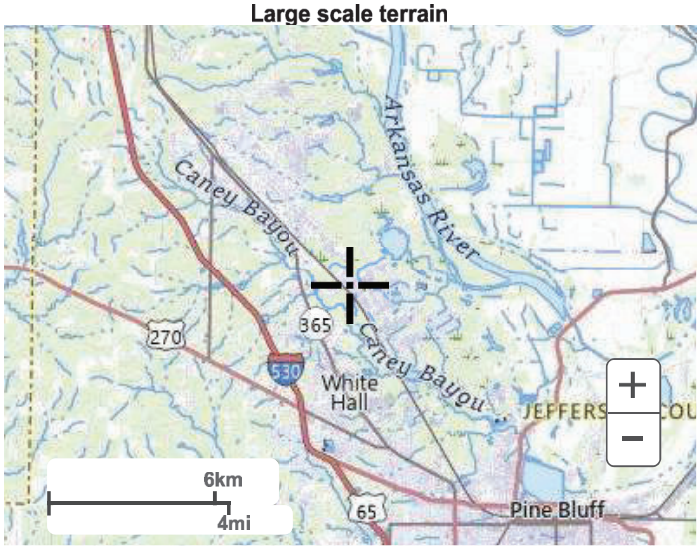
Back to Top

Maps & aerials

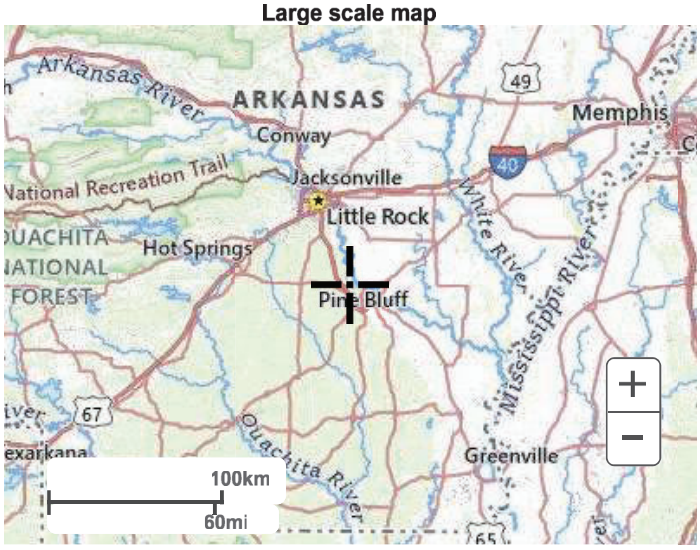
Small scale terrain



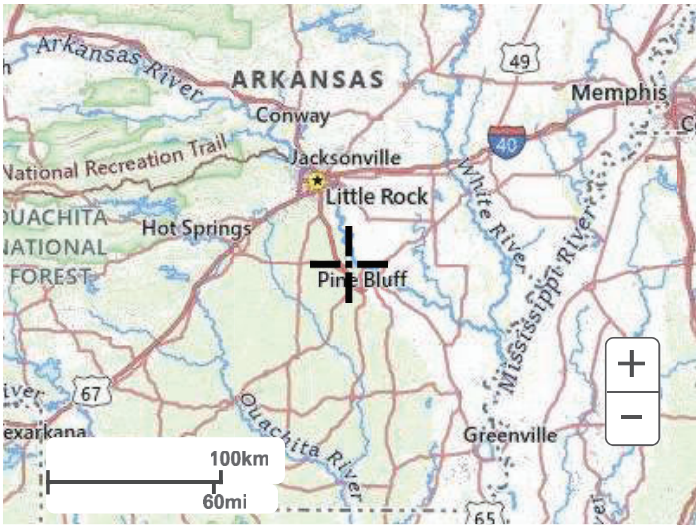
Large scale terrain



Large scale map



Large scale aerial



Back to Top

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National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

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EXHIBIT I: RAINFALL TIME SERIES FROM HEC-HMS MODEL

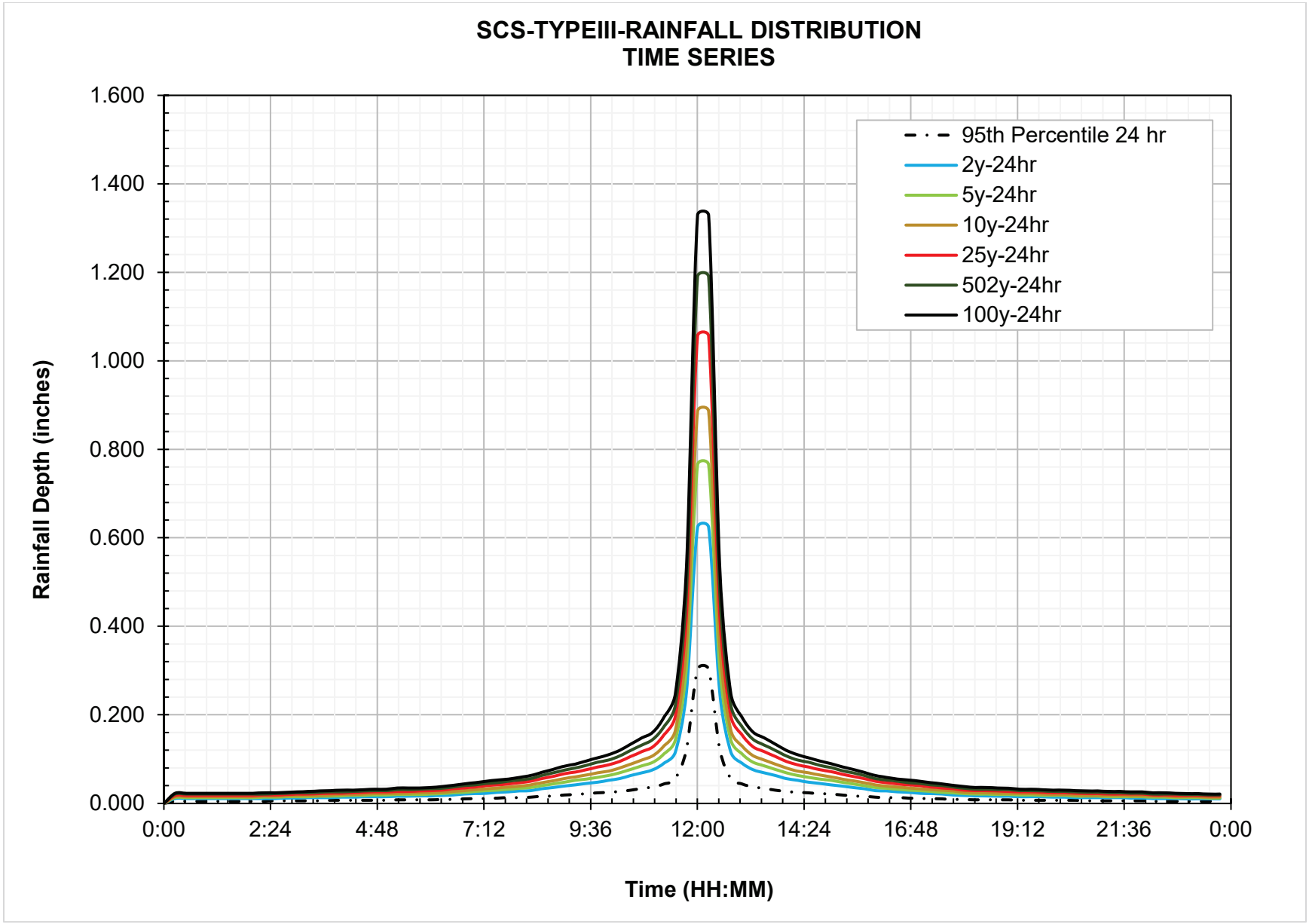


EXHIBIT J- ESIA 438 AND DETENTION POND REQUIREMENT CALCULATION

EISA 438 ANALYSIS AND PRELIMINARY DETENTION POND REQUIREMENT			
Project Name	Pine Bluff Arsenal ACP	**Prepared By**	MC
Project Number	8114	**Date**	4.05.2026
.2026	USACE	**Checked by**	RT
Client Project Location	Pine Bluff Arsenal - Plainview Gate,Hoadley Rd, White Hall,	**Date**	4.11.2026
File Location	J:\0-A&E\Projects\2024\8114-Pine Bluff Arsenal ACP\H&H\Calculation		
Sources/References	*1. UFC-3-210-10 (2015), 2. Soil data (https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx) 3. Urban Hydrology for Small Watersheds, TR-55 4. Curve Number: Federal Highway Administration. National Highway Institute. Highway Hydrology: Hydraulic Design Series Number 2. 2nd ed. 5.FHWA-HIF-02-001. Washington, DC: U.S. Department of Transportation, October 2002, Table 5-4, pp. 5-22 through 5-24.https://www.fhwa.dot.gov/engineering/hydraulics/library_arc.cfm?pub_number=2&id=7 , 6. Rainfall Data: https://www.ncdc.noaa.gov/cdo-web/datasets/GHCND/stations/GHCND:USC00035754/detail*		
Equations used	1. NRCS TR55 Formula, Runoff Depth, inches= Q= (P-0.2S)^2/(P+0.8*S); where S= ((1000/CN)-10), 2.Pond Volume = (Depth/3) * (Top Surface Area+Bottom Surface Area +SQRT(Top Surface Area * Bottom Surface Area))		
NOTES	This is preliminary sizing of detention based on the pervious and impervious area variation between pre-and Post-development scenario during the project initiation. Actual design will be dictated by the proposed site hydraulics and site alignment and correspodning changes in the subcatchements in SWMM Model.		

SITE HYDROLOGY

Pre development				Post Development					Net Increase in Impervious area(Ac) = Predevelopment Pervious area - Postdevelopment Pervious area =(A2+A3)-A'2
Area Name	**Area Symbol**	**Area (ac),A**	**Curve Number, Table 2-2 a & 2-2 c**	**Area Name**	**Area Symbol**	**Area (ac),A**	**Hydrologic Soil Group**	**Curve Number, Table 2-2 a & 2-2 c**	
Roads/Pavement/Sidewalks/Pads/Parking lots (concrete+asphalt)	A1	1.083	98	**Roads/Pavement/Sidewalks/Pads/Parking lots (concrete+asphalt)**	A'1	4.150	D	98	
Grass**	A2	1.907	84	**Grass (Fair,grass cover in betn 50% to 75%)**	A'2	4.760	D	84	3.647
Wood* (Good Condition)/Unimproved (USACE)	A3	6.500	77	**Pond**	A'3	0.580	D	98	
Total Area,ac		9.49	80.8	Total Area,ac		9.49	Composite CN	91.0	

** Woods are protected from grazing, and litter and brush adequately cover the soil. ** Poor condition if grass cover is < 50% of total ground cover.*

RAINFALL DEPTH		
Design Rainfall,inches, $P_{95th\ percentile}$	2.1	NOAA ATLAS 14 PDS
100-year 24-h Rainfall, inches, $P_{100-y-24\ hr}$	9.22	

SOIL TYPE		
Primary soil type	Amy silt loam, 0 to 1 percent slopes	NRCS soil survey
Soil Hydrologic Group	D	

RUNOFF VOLUME CALCULATION

Storm Event	Predevelopment		Postdevelopment			Runoff Volume storage			
	Storage, S,inch	**Initial Abstraction,Ia,inch**	**Storage, S',inch**	**Initial Abstraction',Ia, inch**	**Runoff , Q',inch**	**Increase in Runoff, inch**	**Contributing Drainage Area, A, ac**	**Design Storage for Detention Pond, Vdesign,ac-ft**	**Total storage required, CF**
95th Percentile	2.4	0.5	0.99	0.20	1.25	0.59	9.49	0.467	20,322.70
100 year 24 hr	2.4	0.5	0.99	0.20	8.13	1.25	9.49	0.990	43,114.31

DETENTION POND GEOMTERY AND DESIGN CAPACITY			
Side Slope	H	4	1
Base Width,B,ft	50.00		
Top Width ,T,ft	78.00		
Depth , H, ft	3.50	Without freeboard	
Depth , H', (+1 ft freeboard)	4.00	With freeboard=0.5'	
Base Length, L, ft	150.00	The Flexamat Plus will be used for outfall armoring and also for pond slope stablization.	
Top Length, ft	178.00		
Top Surface Area,A, sf	13,884.00		
Base Surface Area,sf	7,500.00		
Design Volume for Detention Pond, V, CF @ 3.5 ft depth	**36,853**	**OK**	
Design Volume for Detention Pond, V, CF @4 ft depth	**75,000**	**OK**	

1. Net impervious area increase = 3.647 acre which is above 5,000 SF as per EISA 438 requirement,
2. The detention pond storage volume is modified in the final design which is well above the design storage volume of 62,740.64 cubic feet at 100-year level to offset the EISA requirement.

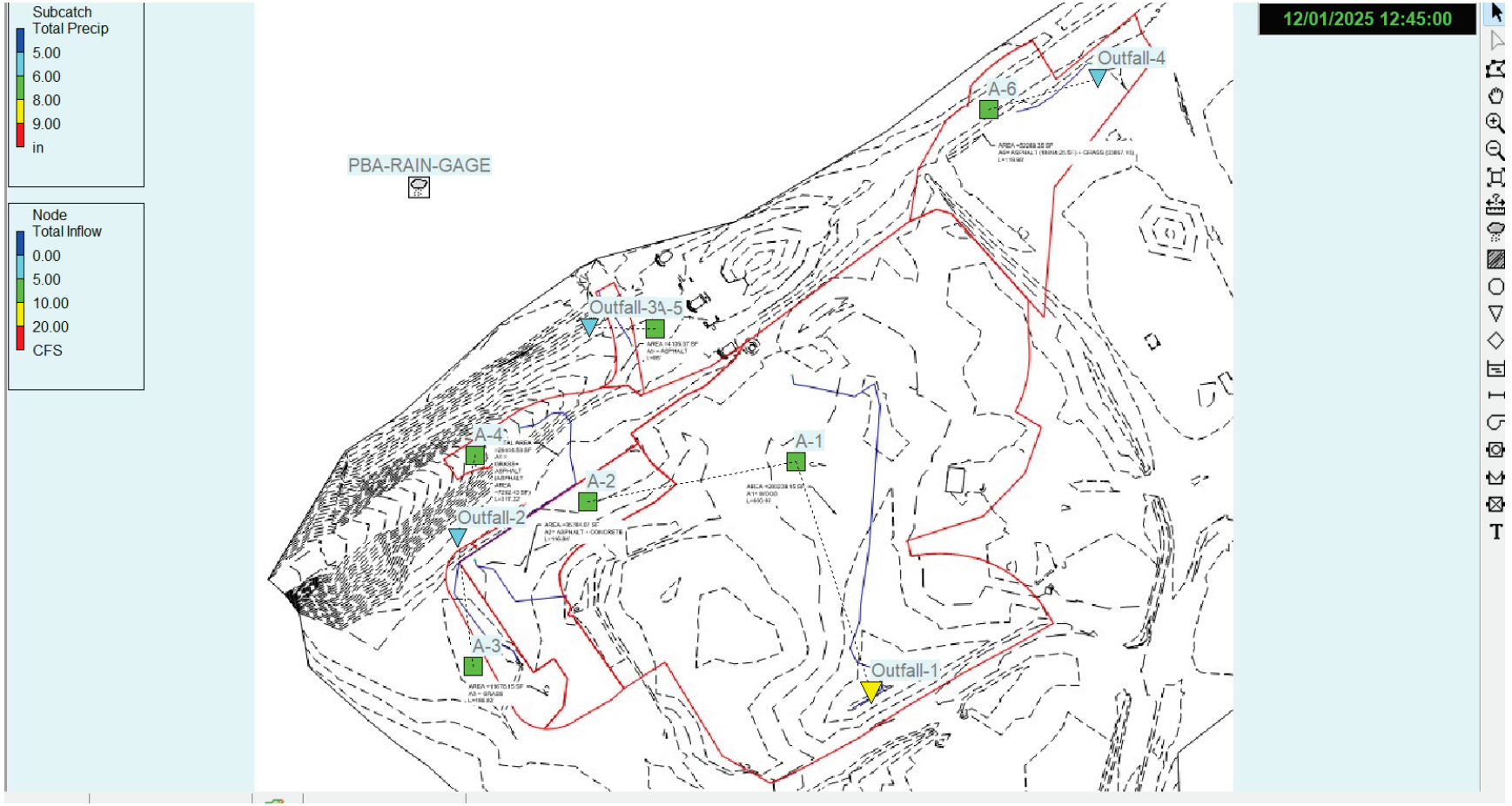
EXHIBIT K: HYDROLOGIC INPUT PARAMETERS AND VALUES (SWMM INPUT)
(PRE-AND POST-DEVELOPMENT)

PREDEVELOPMENT AREA BASED ON TOPOGRAPHIC SURVEY & HYDROLOGIC MODELING PARAMETERS								HSG =	D					
Source: EXHIBIT C- SUBCATCHMENT AREA DELINEATION AND FLOW LENGTH (EXISTING)														
SUBCATCHMENT NAME	LAND USE TYPE	SUBCATCHMENT AREA (SF)	SUBCATCHMENT AREA (ACRE)	UPSTREAM ELEVATION	DOWNSTREAM ELEVATION	FLOW LENGTH, FEET	SURFACE SLOPE	DEPRESSION DEPTH,INCH (PERVIOUS)	DEPRESSION DEPTH,INCH (IMPERVIOUS)	CURVE NUMBER (CN)	OVERLAND N	RUNOFF COEFFICIENT,C	% IMPER-VIOUSNESS	SUBCATCHMENT WIDTH, FEET
A-1	Wood	283,239.15	6.50	247.87	242	600.97	1.0%	0.25	0.05	77	0.40	0.40	0	471.30
A-2	Asphalt+Concrete	35,784.07	0.82	245.8	244	146.84	1.2%	0.25	0.05	98	0.011	0.95	100	243.69
A-3	Grass,Fair Condition	11,676.15	0.27	245	243	196.82	1.0%	0.25	0.05	91	0.15	0.15	0	59.32
A-4	Asphalt+Grass	26,444.53	0.61	250	244	317.22	1.9%	0.25	0.05	87.5	0.011 & 0.15	0.37	27.6	83.36
A-5	Asphalt	4,105.37	0.09	247	244	85	3.5%	0.25	0.05	98	0.011	0.95	100	48.30
A-6	Asphalt+Grass	52,269.35	1.20	247	245	119.98	1.7%	0.25	0.05	89.5	0.011 AND 0.15	0.44	20.4	435.65
Total Area		413,518.62	9.49					Composite CN		81.7	Composite C	0.45		

POSTDEVELOPMENT AREA BASED ON PROPOSED SITE LAYOUT & HYDROLOGIC MODELING PARAMETERS															
HSG =	D														
Source: EXHIBIT E - SUBCATCHMENT AREA DELINEATION AND FLOW LENGTH (PROPOSED)															
SUBCATCHMENT NAME	LAND USE TYPE	SUBCATCHMENT AREA (SF)	SUBCATCHMENT AREA (ACRE)	FLOW LENGTH, FEET	SURFACE SLOPE	DEPRESSION DEPTH,INCH (PERVIOUS)	DEPRESSION DEPTH,INCH (IMPERVIOUS)	CURVE NUMBER (CN)	CN * AREA (AC)	OVERLAND N	RUNOFF COEFFICIENT, C	C * A (AC)	% IMPER-VIOUSNESS	IMPERVIOUS AREA (AC)	SUBCATCHMENT WIDTH, FEET
S1	Asphalt	509.87	0.012	36.63	3.58%	0.25	0.05	98	1.15	0.011	0.95	0.01	100	0.012	13.92
S2	Asphalt	5,838.52	0.134	238.14	1.82%	0.25	0.05	98	13.14	0.011	0.95	0.13	100	0.134	24.52
S3	Asphalt	1,935.20	0.044	114.08	2.00%	0.25	0.05	98	4.35	0.011	0.95	0.04	100	0.044	16.96
S4	Asphalt	2,015.86	0.046	129.93	2.00%	0.25	0.05	98	4.54	0.011	0.95	0.04	100	0.046	15.51
S5	Asphalt	5,229.85	0.120	117.1	2.50%	0.25	0.05	98	11.77	0.011	0.95	0.11	100	0.120	44.66
S6	Asphalt	4,830.13	0.111	122.83	2.00%	0.25	0.05	98	10.87	0.011	0.95	0.11	100	0.111	39.32
S7	Asphalt	7,705.39	0.177	149.59	2.00%	0.25	0.05	98	17.34	0.011	0.95	0.17	100	0.177	51.51
S8	Grass,Fair Condition	10,536.67	0.242	334.96	20.00%	0.25	0.05	84	20.32	0.15	0.15	0.04	0	-	31.46
S9	Grass,Fair Condition	19,937.56	0.458	181.4	1.50%	0.25	0.05	84	38.45	0.15	0.15	0.07	0	-	109.91
S10	Grass,Fair Condition	33,643.37	0.772	294.42	1.88%	0.25	0.05	84	64.88	0.15	0.15	0.12	0	-	114.27
S11	Grass,Fair Condition	14,473.00	0.332	391.74	15.00%	0.25	0.05	84	27.91	0.15	0.15	0.05	0	-	36.95
S12	Asphalt	14,246.61	0.327	27.26	1.96%	0.25	0.05	98	32.05	0.011	0.95	0.31	100	0.327	522.62
S13	Asphalt	15,573.70	0.358	20.1	1.96%	0.25	0.05	98	35.04	0.011	0.95	0.34	100	0.358	774.81
S14	Grass,Fair Condition	27,952.59	0.642	588.54	20.00%	0.25	0.05	84	53.90	0.15	0.15	0.10	0	-	47.49
S15	Grass,Fair Condition	24,774.00	0.569	95.13	2.00%	0.25	0.05	84	47.77	0.15	0.15	0.09	0	-	260.42
S16	Grass,Fair Condition	5,748.05	0.132	109.47	2.00%	0.25	0.05	84	11.08	0.15	0.15	0.02	0	-	52.51
S17	Concrete+Grass+Pond	87,735.42	2.014	231.28	2.50%	0.25	0.05	89	179.26	0.011 and 0.15	0.15	0.30	31.5	0.634	379.35
S18	Asphalt	7,780.89	0.179	146.09	2.00%	0.25	0.05	98	17.51	0.011	0.95	0.17	100	0.179	53.26
S19	Asphalt	13,464.59	0.309	177.52	2.00%	0.25	0.05	98	30.29	0.011	0.95	0.29	100	0.309	75.85
S20	Asphalt	5,398.35	0.124	74.89	2.00%	0.25	0.05	98	12.15	0.011	0.95	0.12	100	0.124	72.08
S21	Asphalt	7,535.42	0.173	90.55	2.84%	0.25	0.05	98	16.95	0.011	0.95	0.16	100	0.173	83.22
S22	Asphalt	46,211.40	1.061	420.29	1.75%	0.25	0.05	98	103.97	0.011	0.95	1.01	100	1.061	109.95
S23	Asphalt	25,836.96	0.593	232.06	3.58%	0.25	0.05	98	58.13	0.011	0.95	0.56	100	0.593	111.34
S24	Asphalt	6,706.73	0.154	65.54	2.00%	0.25	0.05	98	15.09	0.011	0.95	0.15	100	0.154	102.33
S25	Concrete+Grass	3,225.88	0.074	26.11	2.00%	0.25	0.05	92	6.81	0.011 and 0.15	0.60	0.04	55.64	0.041	123.55
S26	Concrete+Grass	2,769.00	0.064	64.01	2.00%	0.25	0.05	80.5	5.12	0.011 and 0.15	0.71	0.05	70.1	0.045	43.26
S27	Concrete+Grass	4,401.43	0.101	127.65	2.00%	0.25	0.05	89.2	9.01	0.011 and 0.15	0.44	0.04	36.8	0.037	34.48
S28	Concrete+Grass	5,085.54	0.117	68.93	2.00%	0.25	0.05	93.1	10.87	0.011 and 0.15	0.67	0.08	65.1	0.076	73.78
S29	Concrete+Grass	2,216.45	0.051	25.97	2.00%	0.25	0.05	93.5	4.76	0.011 and 0.15	0.69	0.04	67.8	0.034	85.35
TOTAL AREA		413,318.43	9.49				COMPOSITE CN		91.1	COMPOSITE C		0.50	OVERALL IMPERVIOUSNESS (%)	50.5	

EXHIBIT L: SWMM 25-YR-24-HR & 100-YR-24-HR SIMULATION OUTPUT VISUALIZATION (PREDEVELOPMENT)

PINE BLUFF ARSENAL -ACP PROJECT -PREDEVELOPMENT SIMULATION (25 YEAR-24 HOUR CONTINUOUS EVENT)



PINE BLUFF ARSENAL -ACP PROJECT -PREDEVELOPMENT SIMULATION (100YEAR-24 HOUR CONTINUOUS EVENT)

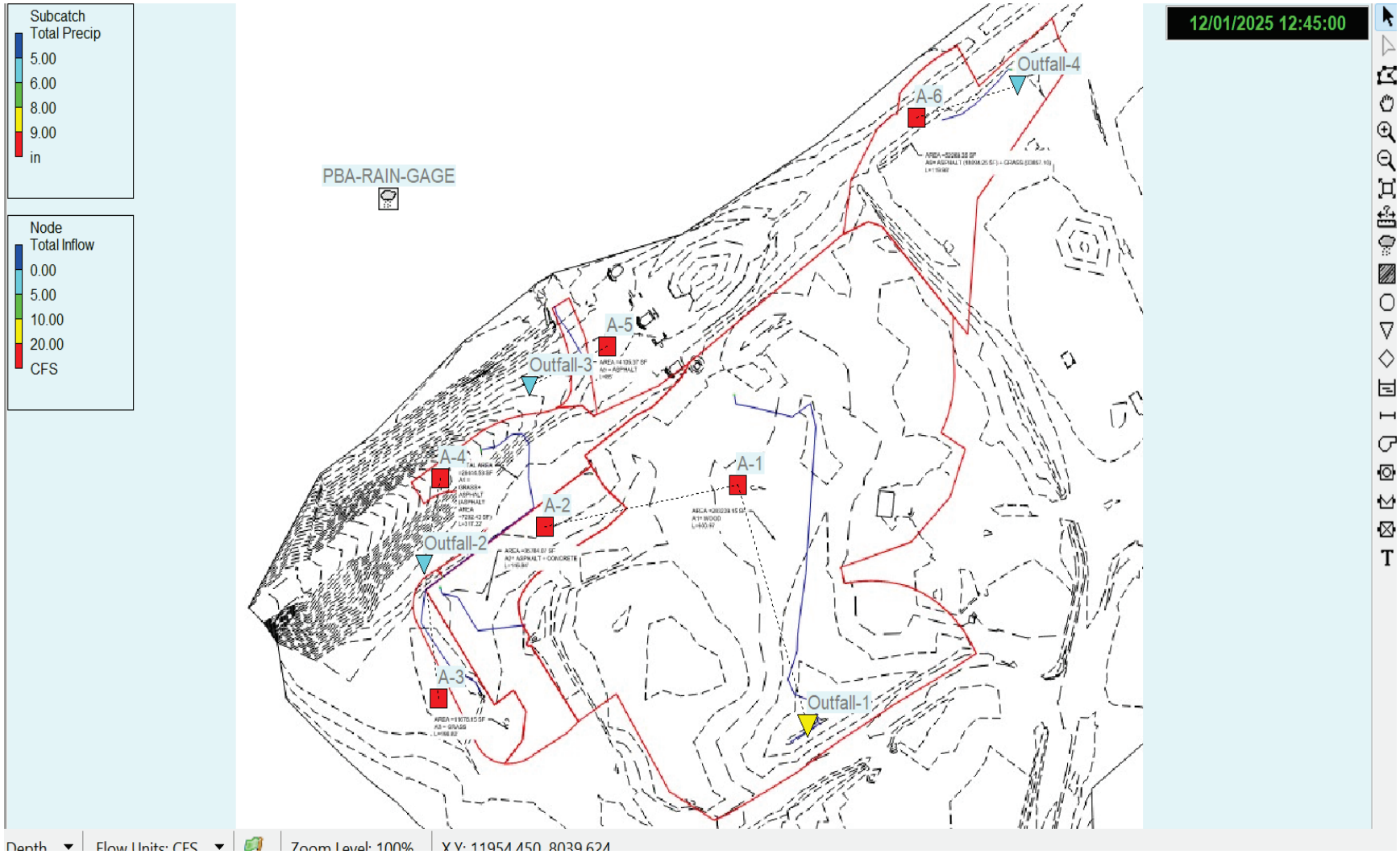


EXHIBIT M: DESIGN CALCULATION FOR CURB CUT, SPLASH PAD, & INLET RISER SYSTEM (SWMM INPUT)

Subject	**Curb Cut Design Calculations**			
Project Name	Pine Bluff Arsenal ACP		**Prepared By**	MC
Project Number	8114		**Date**	2.25.2026
Client	USACE		**Checked by**	RT
Project Location	Pine Bluff Arsenal - Plainview Gate,Hoadley Rd, White Hall, AR 71602		**Date**	3.11.2026
File Location	J:\0-A&E\Projects\2024\8114-Pine Bluff Arsenal ACP\H&H\Calculation			
Sources/References	UFC 3-201-01 (2022), Civil Engineering			
	FHWA HEC-22 (2024), Urban Drainage Design Manual			
	Flexamat Plus Data Sheet			
	UFC 3-210-10 (2023), Low Impact Development			
	Rainfall Intensity: NOAA ATLAS 14 for PINE BLUFF, ARKANSAS			
	Runoff coefficient data: USACE EM 1110-2-1417 – Flood-Runoff Analysis (1994), Table 11-1			
Formula Used	**1. Peak flow (cfs)** = K * C * I * A; where K = multiplication factor for recurrance interval, C = Runoff coefficient, I = Rainfall Intensity (in/hr), A = Drainage Area (ac)			
	2. Unit discharge, q (cfs/ft) = Qe/L , Qe (cfs) = Flow through each curb cut, L(ft) = Crest length of each curb cut.			
	3-a) For mild shallow flow, Unit discharge, q (cfs/ft) = (1.486/n)* h^5/3*S^0.5 , n (s/ft^1/3) = Manning's roughness coefficient, h(ft)= Depth of sheet flow over surafce, S(FT/FT)= Surface Slope, **3-b) Velocity ,V (fps)** = q(cfs//ft) / h(ft), **3-c) Boundary shear stress ,τ** = γ*h*S			

INPUT		NOTES
Drainage Area, ac	0.69	
Runoff coefficient, C (Postdevelopment)	0.95	
Time of concentration,Tc, min (Postdevelopment)	5	
Max Head, Hmax,ft	0.5	Up to the curb height
Design head, Hd, ft	0.35	
Length of weir, ft	6	
Discharge coeffcieint, Cd	3.367	
Total curb length, ft	360	Total curb length
Flexamat Manning's n	0.035	https://www.flexamat.com/flexamat-design-parameters
Side Slope,S(ft/ft) (4H:1V)	0.25	
Unit weight of water, γ (pcf)	62.4	

OUTPUT

Peak Flow Estimation			
Rainfall Recurracne Interval, years	**Rainfall Intensity (postdevelopment), in/hr**	**K**	**Peak Flow (Postdevelopment), cfs**
5	7.18	1	4.71
10	8.09	1	5.30
25	9.3	1.1	6.71
50	10.2	1.2	8.02
100	11.1	1.25	9.10

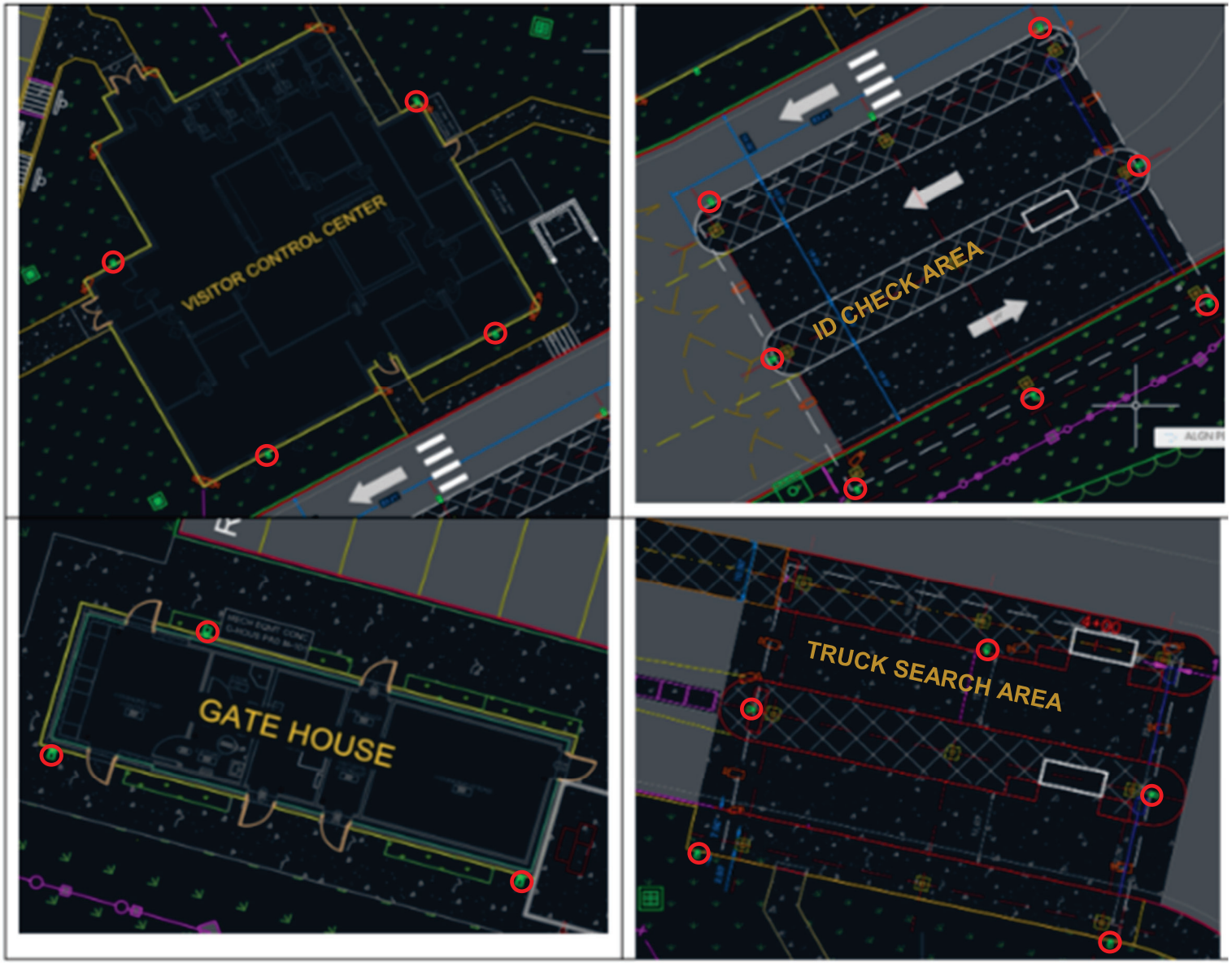
Rating Table (Curb Cut) (for SWMM Model)	
HEAD, H, ft	**Q (cfs)**
0.1	0.64
0.15	1.17
0.2	1.81
0.25	2.53
0.3	3.32
0.35	4.18

No of Curb cut required(calculated)	2.74
No of Curb cut required(Rounded up)	3
Spacing, ft	114
Flow through each curb cut, cfs	3.03
Flexamat to prevent erosion (on the sloping ditch bank)	
Unit discharge (cfs/ft)	0.505
Depth of sheet flow, h(ft)	0.1062
Velocity over the sloping surface, Vs (fps)	4.76
Shear Stress,τ (psf)	1.656
Flexamat Shear Stress, psf	24
Limiting erosive velocity, fps	30

https://grogreen.us/PDS/Erosion-Blankets/GS_TRM_FlexamatPlus.pdf

Design Remarks
1. USE CURB CUT WITH DIMENSION (Minimum) : L = 6', H= 0.5' at 114' spacing
2. Place first curb cut at 114' from the far nrothern end of ID Check area.
3. Make sure at the end of each curb cut Flexamat Plus is installed up to the ditch bottom (Slope 4H:1V).
4. The curb cut invert can be flushed with the Bottom of Curb. Gutter should be terminated before the edge of the curb cut.

DOWNSPOUT LOCATIONS AROUND THE PBA-ACP FACILITIES



Downspout Locations

NOAA ATLAS-14 PDS-based precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration, min	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5	5.33	6.05	7.18	8.09	9.3	10.2	11.1	11.9	13	13.8
10	3.9	4.42	5.26	5.92	6.81	7.48	8.12	8.74	9.55	10.1
15	3.17	3.6	4.27	4.82	5.54	6.08	6.6	7.11	7.76	8.23
30	2.38	2.7	3.22	3.63	4.18	4.58	4.97	5.34	5.82	6.16
60	1.58	1.8	2.14	2.42	2.8	3.08	**3.36**	3.64	4	4.26
120	0.989	1.12	1.34	1.52	1.76	1.94	2.12	2.3	2.54	2.72
180	0.738	0.838	1	1.14	1.33	1.47	1.62	1.77	1.97	2.12
360	0.445	0.508	0.613	0.701	0.826	0.924	1.02	1.13	1.26	1.37
720	0.263	0.303	0.37	0.427	0.508	0.571	0.636	0.703	0.793	0.863
1440	0.155	0.18	0.221	0.256	0.305	0.344	0.384	0.425	0.481	0.524
2880	0.091	0.104	0.128	0.147	0.175	0.197	0.22	0.243	0.275	0.3
4320	0.066	0.076	0.092	0.106	0.126	0.141	0.157	0.174	0.196	0.213
5760	0.053	0.061	0.073	0.084	0.099	0.112	0.124	0.137	0.154	0.167
10080	0.035	0.04	0.048	0.054	0.064	0.071	0.079	0.087	0.097	0.106
14400	0.028	0.031	0.037	0.042	0.049	0.054	0.06	0.065	0.073	0.079
28800	0.018	0.02	0.024	0.027	0.03	0.033	0.036	0.039	0.043	0.046
43200	0.015	0.016	0.019	0.021	0.024	0.026	0.028	0.03	0.033	0.035
64800	0.012	0.013	0.015	0.017	0.019	0.021	0.022	0.024	0.026	0.027
86400	0.01	0.011	0.013	0.015	0.017	0.018	0.02	0.021	0.022	0.024

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Subject	**Roof drain , Splash pad design**			
Project Name	Pine Bluff Arsenal ACP		**Prepared By**	MC
Project Number	8114		**Date**	2.25.2026
Client	USACE		**Checked by**	RT
Project Location	Pine Bluff Arsenal - Plainview Gate,Hoadley Rd, White Hall, AR 71602		**Date**	3.11.2026
File Location	J:\0-A&E\Projects\2024\8114-Pine Bluff Arsenal ACP\H&H\Calculation			
References	1.TR-55 , Urban hydrology for small waterhseds			
	2.UFC 3-201-01, Civil Engineering (20 Dec 2022).			
	3. UFC 3-420-01, Plumbing System (01 Apr 2021).			
	4. Rainfall Data: NOAA Atlas 14 Rainfall data for Pine Bluff, Arkansas.			
	5. Runoff coefficient data: USACE EM 1110-2-1417 – Flood-Runoff Analysis (1994), Table 11-1 (Page-11-2)			
Equations	1. **Peak Roof Runoff, Qroof (cfs)** = C_{roof} * I * A_{roof}; C_{roof} = Roof Runoff coefficient, I = Rainfall Intensity (in/hr) (100-year,1-hr), A_{roof} = Condtributing Roof Area (ac)			
	2. **Flow through conduits, Qpipe (cfs)**= (1.486/n) x A * $R^{2/3}$ x $S^{0.5}$; n= Manning's roughness coefficient (s/ft^1/3) , A = Flow area (ft^2), R = Hydraulic Radius (ft), S = Slope (ft/ft)			
Design Criteria	a) Storm drainage (roof drains/leaders/conductors) to 5 ft outside the building.			
	b) Minimum underground roof drain pipe ID = 6 in (or size per UFC 3-420-01 / IPC, whichever larger)			
	c) Air break (4"-6") between downspouts and underground piping must be provided.			
	d) Maximum 3 downspouts per underground roof drainage header are permitted.			
	e) Each header must connect to a storm drainage structure (catch basin / manhole).			
	f) Maximum distance of 150 ft from most distant downspout to that structure must be maintained.			
	g) Cleanouts are required at each downspout connection, at direction changes with≤ 100 ft apart.			
	h) Design Rainfall for roof drainage as per IPC =100-yr, 1-hr			
	i) Open discharge to grade must be done with splash blocks/paved channels to move flow away from structure and avoid safety hazards.			
NOTES	Not all downspouts locations need to be provided with splash pads. Rather some locations will be provided with underground roof drain connections.			

DESIGN INPUT

Facility Name	No of Downspouts (east side)	Contributing Roof Area per downspout (east side) (sf)	No of Downspouts (west side)	Contributing Roof Area per downspout (west side)(sf)	No of Downspouts (north side)	Contributing Roof Area per downspout (north side) (sf)	No of Downspouts (South side)	Contributing Roof Area per downspout (South side)(sf)	FF EL
VISITOR CONTROL CENTER	0	0	0	0	2	1810	2	1078	251.6
ID CHECK AREA	1	619	1	619	1	1000	2	500	Varies
TRUCK SEARCH AREA	1	956.25	1	956.25	3	517	3	517	Varies
GATEHOUSE	0	0	0	0	1	720	2	360	249

100-yr-1-hr Rainfall Intensity (inhc/hr), I	Roof Runoff Coefficient,C	Manning's n for PVC pipe, (s/ft^1/3)
3.36	0.95	0.012

DESIGN OUTPUT

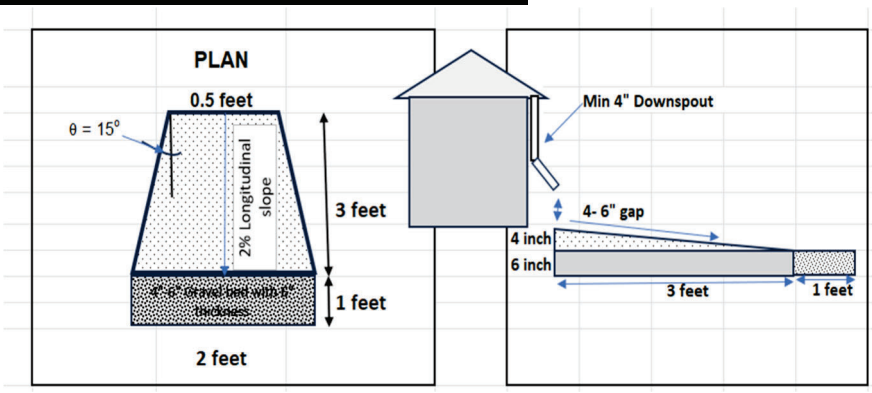
PEAK FLOW CALCULATION (MAXIMUM 3 DOWNSPOUTS TO ONE HEADER PIPE)

Facility Name	Peak Roof Runoff, Qroof (cfs)			
	EAST	WEST	NORTH	SOUTH
VISITOR CONTROL	0.00	0.00	0.27	0.16
ID CHECK AREA	0.05	0.05	0.07	0.07
TRUCK SEARCH AREA	0.07	0.07	0.11	0.11
GATEHOUSE	0.00	0.00	0.05	0.05

Minimum Roof Runoff, Qmin, cfs	0.05
Maximum Roof Runoff, Qmax, cfs	0.27

HEADER PIPE SIZING					
Slope (ft/ft)	**Diameter (inch)**	**Area (sf)**	**Hydraulic Radius (ft)**	**Qpipe (cfs)**	**Qpipe ≥ Qmax?**
0.0050	6	0.196	0.125	0.43	YES, PIPE ADEQUATE
0.0055	6	0.196	0.125	0.45	YES, PIPE ADEQUATE
0.0060	6	0.196	0.125	0.47	YES, PIPE ADEQUATE
0.0065	6	0.196	0.125	0.49	YES, PIPE ADEQUATE
0.0070	6	0.196	0.125	0.51	YES, PIPE ADEQUATE
0.0075	6	0.196	0.125	0.53	YES, PIPE ADEQUATE
0.0080	6	0.196	0.125	0.54	YES, PIPE ADEQUATE
0.0085	6	0.196	0.125	0.56	YES, PIPE ADEQUATE
0.0090	6	0.196	0.125	0.58	YES, PIPE ADEQUATE
0.0095	6	0.196	0.125	0.59	YES, PIPE ADEQUATE
0.0100	6	0.196	0.125	0.61	YES, PIPE ADEQUATE

SPLASH PAD DESIGN	
Typical downspout size (round leader equivalent)), inch	4
Area of downspout, Ad, ft^2	0.087
Max exit velocity before air break, fps $=Q_{min}/A_d$	3.04
Min exit velocity before air break, fps $= Q_{max}/A_d$	0.52
Free fall vecloity , fps (considering 6" air break) = $\sqrt{}$(2*g* air break distance)	5.7
Maximum Design Velocity , Vd(max) (fps) = Exit Velocity + Free Fall velocity	8.7
Minimum Design Velocity , Vd(min) (fps) = Exit Velocity + Free Fall velocity	6.2
Jet area = Q max/ Vd(max), sf	0.0304
Design flow depth of 2", ft	0.167
Calculated Intital width, (inch)	2.2
Minimum design Intital width, bo (inch)	6.0
Minimum end width, b' (inch)	24.0
Flared angle, θ, degree	15
Flared Length, L_f =(b'-bo)/2sinθ, inch	34.8
Linear length,L_l =L_f*cosθ	33.59



EROSIVE VELOCITY CHECK AT THE END OF SPLASH PAD (For wide rectnagular channel Hydraulic Radius is equivalent to Normal Depth)					
Trial Depth, inch	**Slope S,(ft/ft) (Provide 2% slope)**	**Manning's n , s/ft^1/3**	**Erosive Velocity exiting Splash pad, fps**	**Final Flow , cfs**	**Final Flow> Max Design Flow?**
4	0.02	0.015	0.52	0.35	YES-ADEQUATE

RIPRAP EXTENSION (4"-6" gravels)	
Length, ft	1
Width, ft	2
Thickness, ft	0.5

DESIGN REMARKS:
1. Type: Flared Recinforced Concrete Splash Pad or Apron
2. Total Length : 3 feet
3. Width near downspout (upstream): 0.5 feet
4. End width(downstream) : 2 feet
5. Concrete slab thickness: 6 inch
6. Edge curb height: 4 inch flushed with the grade at the end of apron.
7. Slope: Must be 2%
8. Provide riprap at the end of the splash pad to withstand that lower erosive velocity for extra protection if discharged to turf or road or parking lot with heavy traffic or padestrain movements.
9. The flow from splash pad must go to the nearest catch basin or inlets before transferring to header pipe.

Subject	**Combined Rating Curve for Riser Inlet for SWMM Model Input**			
Project Name	Pine Bluff Arsenal ACP		**Prepared By**	MC
Project Number	8114		**Date**	3.18.2026
Client	USACE		**Checked by**	RT
Project Location	Pine Bluff Arsenal - Plainview Gate,Hoadley Rd, White Hall, AR 71602		**Date**	3.24.2026
File Location	J:\0-A&E\Projects\2024\8114-Pine Bluff Arsenal ACP\H&H\Calculation			
Sources/References	*a) USACE. EM 1110-2-1602: Hydraulic Design of Reservoir Outlet Works*			
	b) USACE. EM 1110-2-1603: Hydraulic Design of Spillways			
	c) USBR. Water Measurement Manual (3rd Edition)			
	d) NRCS. TR-55: Urban Hydrology for Small Watersheds			
	e) NRCS. TR-60: Earth Dams and Reservoirs			
	f) FHWA. HEC-22: Urban Drainage Design Manual			
	g) Chow, V.T. Open Channel Hydraulics			
Formula Used	**1. Rectangular Orifice flow (cfs) (0 ≤ h < 1.0')** = Cd*b*√2g*(2/3)*h^1.5 (Partially submerged behavior)			
	2. Orifice flow (cfs) (h ≥1 .0') = Cd*b*√(2g*(h-0.5)) (submerged/orifice control with centroid head)			
	3. Sharp Crested Weir Flow through the Grated Opening on top of the Riser Inlet, Qriser (cfs) = Cw*L*(h-2.2) ^1.5			

INPUT		NOTES
Riser Dia, D, ft	3	
Discharge coefficient, Cd	0.62	
Weir coefficient, Cw	1.95	Not a regular weir, Typical C for regular weir = 3.1 but for Rack Cw = 0.65C based on Reference c) & f)
Gravitational acclelaration,g,ft/s^2	32.2	
Width of Rectangular Closed Orifice, b,ft	1	
Length of inlet riser, L=ΠD, ft	9.42	

OUTPUT

Depth,h ,ft	Rectangular Bottom Orifice(1' x 1'),cfs	Grated Open Riser Crest,cfs	Total Flow though Riser, cfs
0	0.00	0.00	0.00
0.1	0.10	0.00	0.10
0.2	0.30	0.00	0.30
0.3	0.55	0.00	0.55
0.4	0.84	0.00	0.84
0.5	1.17	0.00	1.17
0.6	1.54	0.00	1.54
0.7	1.94	0.00	1.94
0.8	2.37	0.00	2.37
0.9	2.83	0.00	2.83
1	3.52	0.00	3.52
1.1	3.85	0.00	3.85
1.2	4.16	0.00	4.16
1.3	4.45	0.00	4.45
1.4	4.72	0.00	4.72
1.5	4.98	0.00	4.98
1.6	5.22	0.00	5.22
1.7	5.45	0.00	5.45
1.8	5.67	0.00	5.67
1.9	5.89	0.00	5.89
2	6.09	0.00	6.09
2.1	6.29	0.00	6.29
2.2	6.49	0.00	6.49
2.3	6.68	0.58	7.26
2.4	6.86	1.64	8.50
2.5	7.04	3.02	10.06
2.6	7.21	4.65	11.86
2.7	7.38	6.50	13.88
2.8	7.55	8.54	16.09
2.9	7.71	10.76	18.47
3	7.87	13.15	21.02
3.5	8.62	27.24	35.86

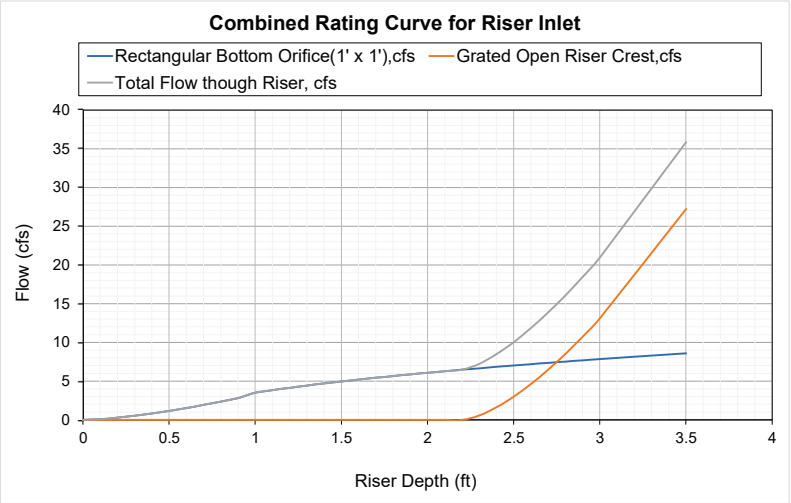
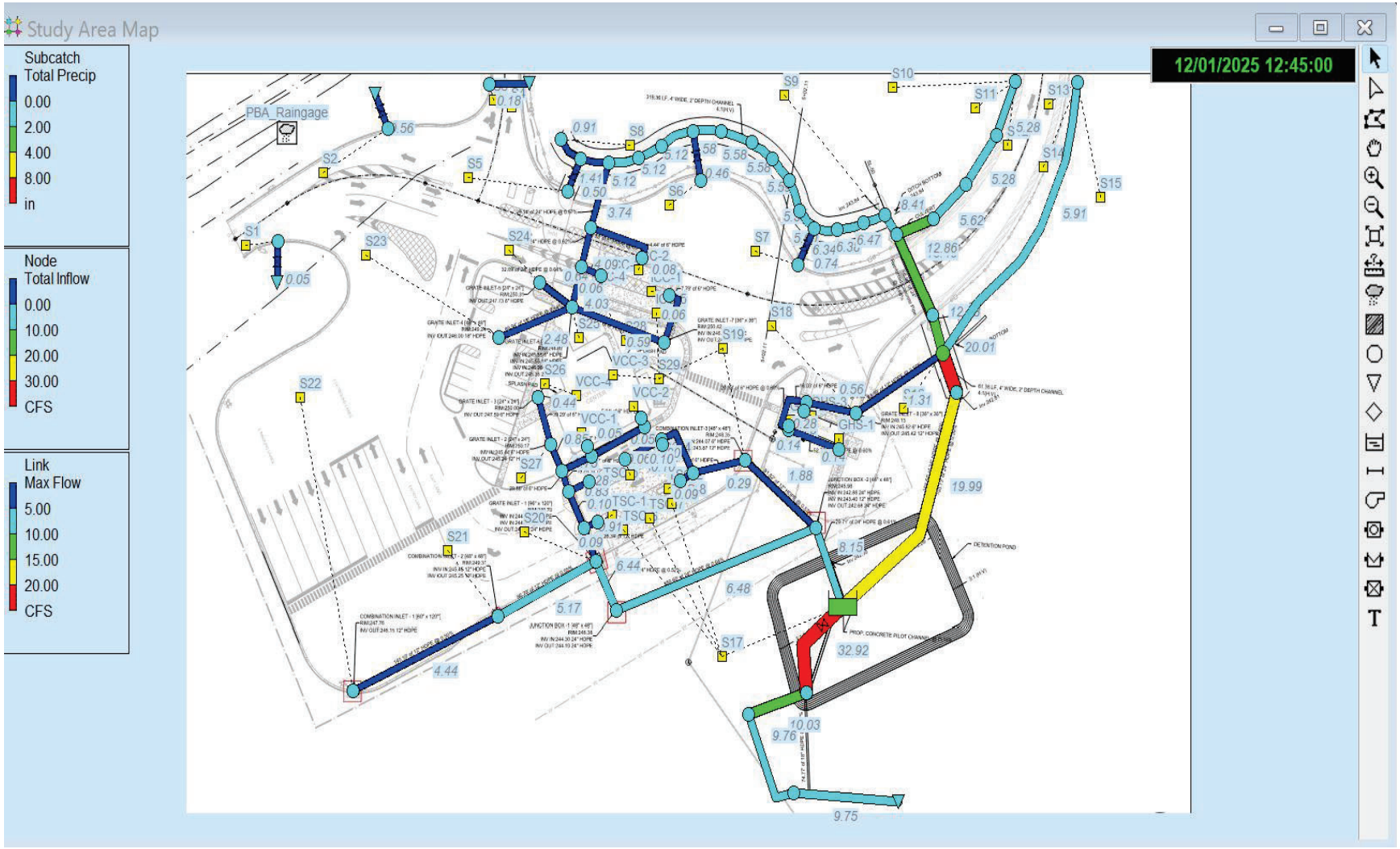
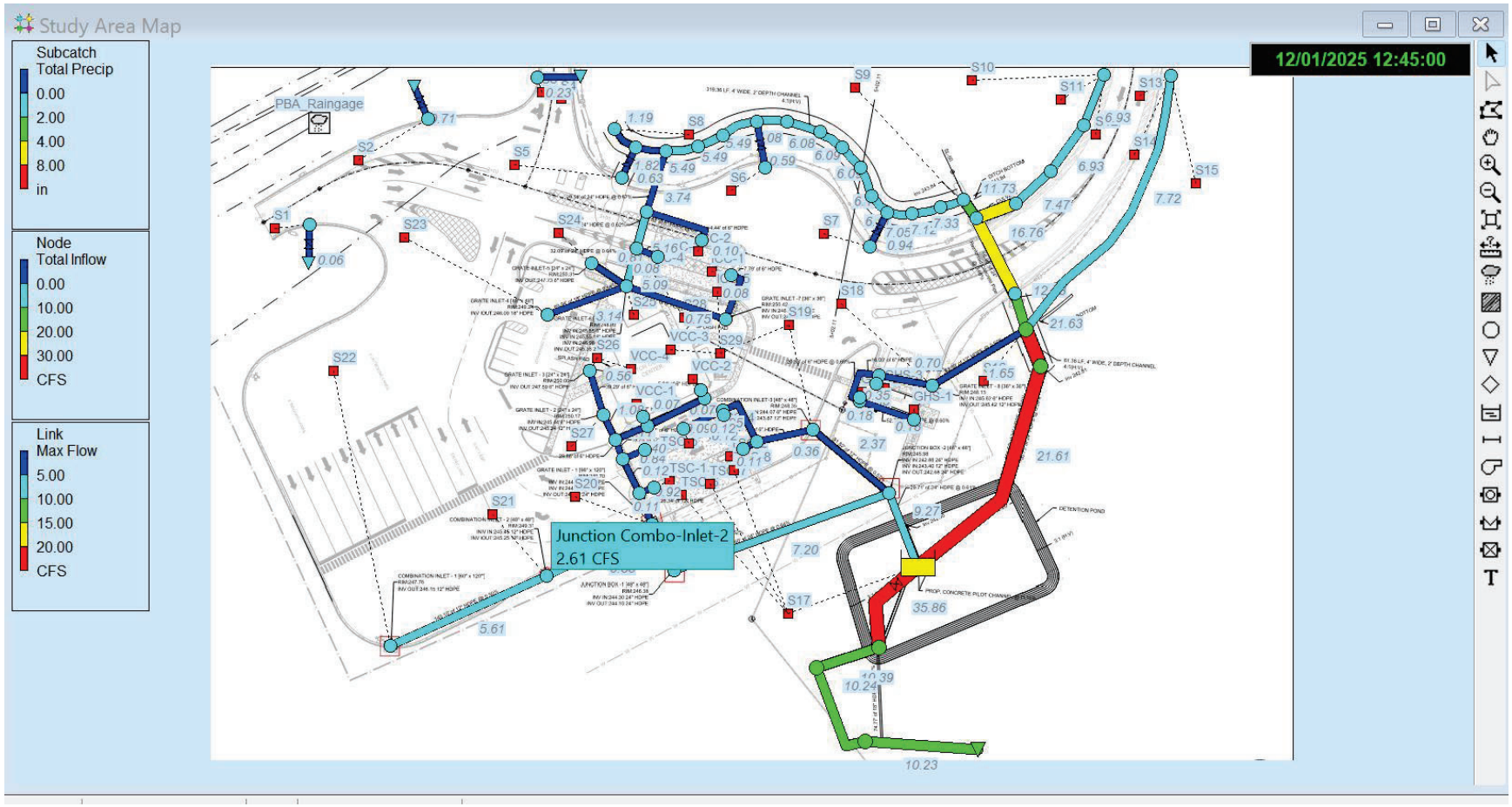


EXHIBIT N: SWMM 25-YR-24-HR & 100-YR-24-HR SIMULATION OUTPUT VISUALIZATION (POSTDEVELOPMENT)

PINE BLUFF ARSENAL -ACP PROJECT -POSTDEVELOPMENT SIMULATION (25 YEAR-24 HOUR CONTINUOUS EVENT)



PINE BLUFF ARSENAL -ACP PROJECT -POSTDEVELOPMENT SIMULATION (100YEAR-24 HOUR CONTINUOUS EVENT)



Sheet flow

Sheet flow is flow over plane surfaces. It usually occurs in the headwater of streams. With sheet flow, the friction value (Manning's n) is an effective roughness coefficient that includes the effect of raindrop impact; drag over the plane surface; obstacles such as litter, crop ridges, and rocks; and erosion and transportation of sediment. These n values are for very shallow flow depths of about 0.1 foot or so. Table 3-1 gives Manning's n values for sheet flow for various surface conditions.

Table 3-1 Roughness coefficients (Manning's n) for sheet flow

Surface description	n [1/]
Smooth surfaces (concrete, asphalt, gravel, or bare soil)	0.011
Fallow (no residue)	0.05
Cultivated soils:	
Residue cover ≤20%	0.06
Residue cover >20%	0.17
Grass:	
Short grass prairie	0.15
Dense grasses [2/]	0.24
Bermudagrass	0.41
Range (natural)	0.13
Woods: [3/]	
Light underbrush	0.40
Dense underbrush	0.80

1 The n values are a composite of information compiled by Engman (1986).

2 Includes species such as weeping lovegrass, bluegrass, buffalo grass, blue grama grass, and native grass mixtures.

3 When selecting n , consider cover to a height of about 0.1 ft. This is the only part of the plant cover that will obstruct sheet flow.

For sheet flow of less than 300 feet, use Manning's kinematic solution (Overtop and Meadows 1976) to compute T_t:

$$T_t = \frac{0.007(nL)^{0.8}}{(P_2)^{0.5} s^{0.4}} \qquad \text{[eq. 3-3]}$$

where:

T_t = travel time (hr),
n = Manning's roughness coefficient (table 3-1)
L = flow length (ft)
P_2 = 2-year, 24-hour rainfall (in)
s = slope of hydraulic grade line (land slope, ft/ft)

This simplified form of the Manning's kinematic solution is based on the following: (1) shallow steady uniform flow, (2) constant intensity of rainfall excess (that part of a rain available for runoff), (3) rainfall duration of 24 hours, and (4) minor effect of infiltration on travel time. Rainfall depth can be obtained from appendix B.

Shallow concentrated flow

After a maximum of 300 feet, sheet flow usually becomes shallow concentrated flow. The average velocity for this flow can be determined from figure 3-1, in which average velocity is a function of watercourse slope and type of channel. For slopes less than 0.005 ft/ft, use equations given in appendix F for figure 3-1. Tillage can affect the direction of shallow concentrated flow. Flow may not always be directly down the watershed slope if tillage runs across the slope.

After determining average velocity in figure 3-1, use equation 3-1 to estimate travel time for the shallow concentrated flow segment.

Open channels

Open channels are assumed to begin where surveyed cross section information has been obtained, where channels are visible on aerial photographs, or where blue lines (indicating streams) appear on United States Geological Survey (USGS) quadrangle sheets. Manning's equation or water surface profile information can be used to estimate average flow velocity. Average flow velocity is usually determined for bankfull elevation.

Table 2-2a Runoff curve numbers for urban areas [1]

Cover description: Cover type and hydrologic condition	Average percent impervious area [2]	Curve numbers for hydrologic soil group: A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) [3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) [4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation) [5]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

[1] Average runoff condition, and $I_a = 0.2S$.

[2] The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

[3] CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

[4] Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

[5] Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2c Runoff curve numbers for other agricultural lands [1/]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. [2/]	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. [3/]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30 [4/]	48	65	73
Woods—grass combination (orchard or tree farm). [5/]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. [6/]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 [4/]	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

1 Average runoff condition, and $I_a = 0.2S$.

2 *Poor:* <50%) ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: > 75% ground cover and lightly or only occasionally grazed.

3 *Poor*: <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

4 Actual curve number is less than 30; use CN = 30 for runoff computations.

5 CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

6 *Poor:* Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

Rational Formula
Runoff Coefficients

GRASS

Type of Drainage Area	Runoff Coefficient
Lawns:	
Sandy soil, flat, less than 2%	0.05-0.10
Sandy soil, average, 2 to 7%	0.10-0.15
Sandy soil, steep, greater than 7%	0.15-0.20
Heavy soil, flat, less than 2%	0.13-0.17
Heavy soil, average, 2 to 7%	0.18-0.22
Heavy soil, steep, greater than 7%	0.25-0.35
Business:	
Downtown areas	0.70-0.95
Neighborhood areas	0.50-0.70
Residential:	
Single-family areas	0.30-0.50
Multi units, detached	0.40-0.60
Multi units, attached	0.60-0.75
Suburban	0.25-0.40
Apartment dwelling areas	0.50-0.70
Industrial:	
Light areas	0.50-0.80
Heavy areas	0.60-0.90
Parks, cemeteries	0.10-0.25
Playgrounds	0.20-0.35
Railroad yard areas	0.20-0.40
Unimproved areas	0.10-0.30
Streets:	
Asphalt	0.70-0.95
Concrete	0.80-0.95
Brick	0.70-0.85
Drives and walks	0.75-0.85
Roofs	I0.75-0.95

SOURCE: Ven Te Chow, 1964. Handbook of Applied Hydrology, McGraw-Hill Book Co.

Figure B-2 Approximate geographic boundaries for NRCS (SCS) rainfall distributions

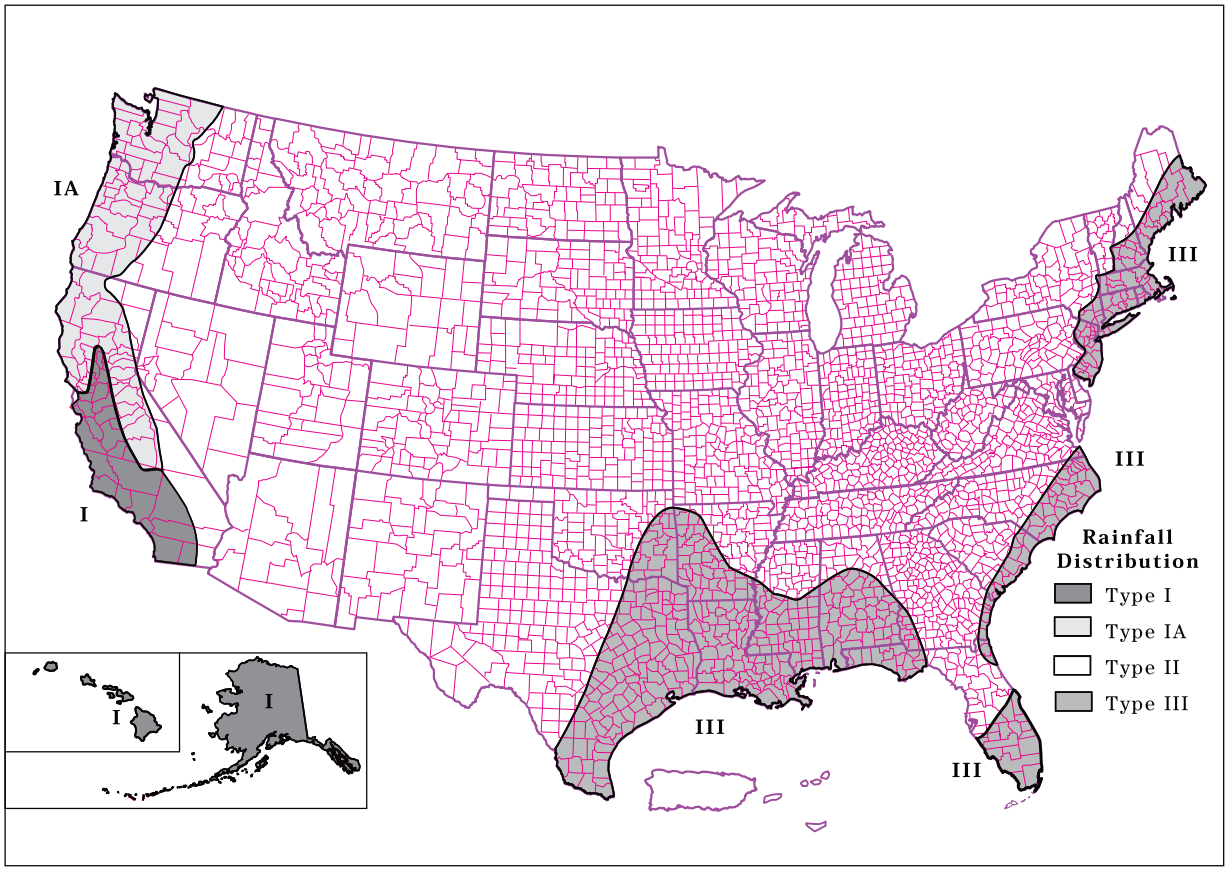
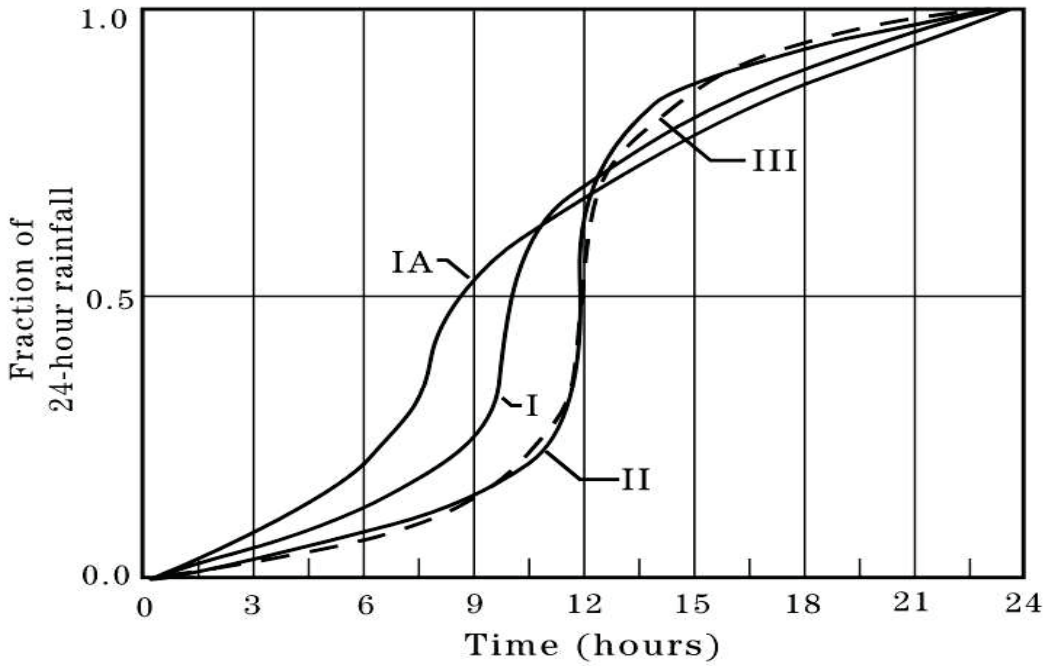


Figure B-1 SCS 24-hour rainfall distributions



Manning's Roughness Coefficient Values

Manning's roughness coefficients are used to calculate flows using Manning's equation. Values from American Society of Civil Engineers(ASCE) 1992, FHWA 2001, and Chow 1959 are reproduced in Table 4-7, Table 4-8, and Table 4-9.

Type of channel	Manning's n
A. Natural streams	
1. Minor streams (top width at flood stage < 100 ft)	
a. Clean, straight, full, no rifts or deep pools	0.025-0.033
b. Same as a, but more stones and weeds	0.030-0.040
c. Clean, winding, some pools and shoals	0.033-0.045
d. Same as c, but some weeds and stones	0.035-0.050
e. Same as d, lower stages, more ineffective	0.040-0.055
f. Same as d, more stones	0.045-0.060
g. Sluggish reaches, weedy, deep pools	0.050-0.080
h. Very weedy, heavy stand of timber and underbrush	0.075-0.150
i. Mountain streams with gravel and cobbles, few boulders on bottom	0.030-0.050
j. Mountain streams with cobbles and large boulders on bottom	0.040-0.070
2. Floodplains	
a. Pasture, no brush, short grass	0.025-0.035
b. Pasture, no brush, high grass	0.030-0.050
c. Cultivated areas, no crop	0.020-0.040
d. Cultivated areas, mature row crops	0.025-0.045
e. Cultivated areas, mature field crops	0.030-0.050
f. Scattered brush, heavy weeds	0.035-0.070
g. Light brush and trees in winter	0.035-0.060
h. Light brush and trees in summer	0.040-0.080
i. Medium to dense brush in winter	0.045-0.110
j. Medium to dense brush in summer	0.070-0.160
k. Trees, dense willows summer, straight	0.110-0.200
l. Trees, cleared land with tree stumps, no sprouts	0.030-0.050
m. Trees, cleared land with tree stumps, with sprouts	0.050-0.080
n. Trees, heavy stand of timber, few down trees, flood stage below branches	0.080-0.120

Type of channel	Manning's n
o. Trees, heavy stand of timber, few down trees, flood stage reaching branches	0.100-0.160
3. Major streams (top width at flood stage > 100 ft)	
a. Regular section with no boulders or brush	0.025-0.060
b. Irregular rough section	0.035-0.100
B. Excavated or dredged channels	
1. Earth, straight and uniform	
a. Clean, recently completed	0.016-0.020
b. Clean, after weathering	0.018-0.025
c. Gravel, uniform section, clean	0.022-0.030
d. With short grass, few weeds	0.022-0.033
2. Earth, winding and sluggish	
a. No vegetation	0.023-0.030
b. Grass, some weeds	0.025-0.033
c. Deep weeds or aquatic plants in deep channels	0.030-0.040
d. Earth bottom and rubble sides	0.028-0.035
e. Stony bottom and weedy banks	0.025-0.040
f. Cobble bottom and clean sides	0.030-0.050
g. Winding, sluggish, stony bottom, weedy banks	0.025-0.040
h. Dense weeds as high as flow depth	0.050-0.120
3. Dragline-excavated or dredged	
a. No vegetation	0.025-0.033
b. Light brush on banks	0.035-0.060
4. Rock cuts	
a. Smooth and uniform	0.025-0.040
b. Jagged and irregular	0.035-0.050
5. Unmaintained channels	
a. Dense weeds, high as flow depth	0.050-0.120
b. Clean bottom, brush on sides	0.040-0.080
c. Clean bottom, brush on sides, highest stage	0.045-0.110
d. Dense brush, high stage	0.080-0.140
C. Lined channels	

Type of channel	Manning's n
1. Asphalt	0.013-0.016
2. Brick (in cement mortar)	0.012-0.018
3. Concrete	
a. Trowel finish	0.011-0.015
b. Float finish	0.013-0.016
c. Unfinished	0.014-0.020
d. Gunite, regular	0.016-0.023
e. Gunite, wavy	0.018-0.025
4. Riprap (n-value depends on rock size)	0.020-0.035
5. Vegetal lining	0.030-0.500

Table 4-8: Manning's Roughness Coefficients for Streets and Gutters

Type of gutter or pavement	Manning's n
Concrete gutter, troweled finish	0.012
Asphalt pavement: smooth texture	0.013
Asphalt pavement: rough texture	0.016
Concrete gutter with asphalt pavement: smooth texture	0.013
Concrete gutter with asphalt pavement: rough texture	0.015
Concrete pavement: float finish	0.014
Concrete pavement: broom finish	0.016

Table 4-8 note: For gutters with small slope or where sediment may accumulate, increase n values by 0.02 (USDOT, FHWA 2001).

Table 4-9: Manning's Coefficients for Closed Conduits (ASCE 1982, FHWA2001)

Material		Manning's n
Asbestos-cement pipe		0.011-0.015
Brick		0.013-0.017
Cast iron pipe		
	Cement-lined & seal coated	0.011-0.015
Concrete (monolithic)		
	Smooth forms	0.012-0.014
	Rough forms	0.015-0.017
	Concrete pipe	0.011-0.015
	Box (smooth)	0.012-0.015

Corrugated-metal pipe -- (2-1/2 in. x 1/2 in. corrugations)		
	Plain	0.022-0.026
	Paved invert	0.018-0.022
	Spun asphalt lined	0.011-0.015
	Plastic pipe (smooth)	0.011-0.015
Corrugated-metal pipe -- (2-2/3 in. by 1/2 in. annular)		0.022-0.027
Corrugated-metal pipe -- (2-2/3 in. by 1/2 in. helical)		0.011-0.023
Corrugated-metal pipe -- (6 in. by 1 in. helical)		0.022-0.025
Corrugated-metal pipe -- (5 in. by 1 in. helical)		0.025–0.026
Corrugated-metal pipe -- (3 in. by 1 in. helical)		0.027–0.028
Corrugated-metal pipe -- (6 in. by 2 in. structural plate)		0.033–0.035
Corrugated-metal pipe -- (9 in. by 2-1/2 in. structural plate)		0.033–0.037
Corrugated polyethylene		0.010–0.013
	Smooth	0.009-0.015
	Corrugated	0.018–0.025
Spiral rib metal pipe (smooth)		0.012-0.013
Vitrified clay		
	Pipes	0.011-0.015
	Liner plates	0.013-0.017
Polyvinyl chloride (PVC) (smooth)		0.009-0.011
Table 4-9 note: Manning's n for corrugated pipes is a function of the corrugation size, pipe size, and whether the corrugations are annular or helical (see USGS 1993).		

EXHIBIT P: EXHIBIT P - ROOF DRAINAGE AREA AND WIDTH FROM ARCHITECTURAL DRAWING (SWMM INPUT).

ROOF SUBCATCHMENT AREA AND WIDTH - Source : Architechtural drawing

Facility	Name of the areas	Reference Drawing No.	Downspout name	Hieght of Downspout opening at Roof gutter from roof drain invert(ft)	Slope(%)	Subcatchment Area(sf) = Contributing Roof Area (sf) (Sloped area)	Subcatchment Area(ac) = Contributing Roof Area (ac) (Sloped area)		Flow length(ft)	Width (ft)
VISITOR CONTROL CENTER (VCC)	VCC-1	A104, A201, A202, A301, A303	VCC-DSPOUT-1	12	41.67	570.00	0.0131		28.5	20.00
	VCC-2		VCC-DSPOUT-2	12	41.67	570.00	0.0131		28.5	20.00
	VCC-3		SPLASH PAD	12	28.21	1,734.00	0.0398		30	57.80
	VCC-4		SPLASH PAD	12	28.21	1,890.00	0.0434		30	63.00
GATEHOUSE (GHS)	GHS-1	A111, A211,A212,A310	GHS-DSPOUT-1	10	25	1,446.92	0.0332		23.72	61.00
	GHS-2		GHS-DSPOUT-2	10	25	1,446.92	0.0332		23.72	61.00
	GHS-3		GHS-DSPOUT-3	10	25	2,893.84	0.0664		23.72	122.00
ID CHECK CANOPY(ICC)	ICC-1	A121, A221.A321	ICC-DSPOUT-1	18.5	25	618.63	0.0142		25.3	24.45
	ICC-2		ICC-DSPOUT-2	18.5	25	808.00	0.0185		25.3	31.94
	ICC-3		ICC-DSPOUT-3	18.5	25	618.63	0.0142		25.3	24.45
	ICC-4		SPLASH PAD	18.5	25	489.85	0.0112		25.3	19.36
	ICC-5		SPLASH PAD	18.5	25	489.85	0.0112		25.3	19.36
TRUCK SEARCH CANOPY (TSC)	TSC-1	A131.A231.A232, A331	TSC-DSPOT-1	19	25	930.25	0.0214		30.5	30.50
	TSC-2		TSC-DSPOT-2	19	25	930.25	0.0214		30.5	30.50
	TSC-3		TSC-DSPOT-3	19	25	598.50	0.0137		31.5	19.00
	TSC-4		TSC-DSPOT-4	19	25	480.38	0.0110		31.5	15.25
	TSC-5		TSC-DSPOT-5	19	25	480.38	0.0110		31.5	15.25
	TSC-6		SPLASH PAD	19	25	480.38	0.0110		31.5	15.25
	TSC-7		SPLASH PAD	19	25	598.50	0.0137		31.5	19.00
	TSC-8		SPLASH PAD	19	25	480.38	0.0110		31.5	15.25
		VCC= VISTIOR CONTROL CENTER, ICC = ID CHECK CANOPY, TSC = TRUCK SERARCH CANOPY, GHS = GATEHOUSE								

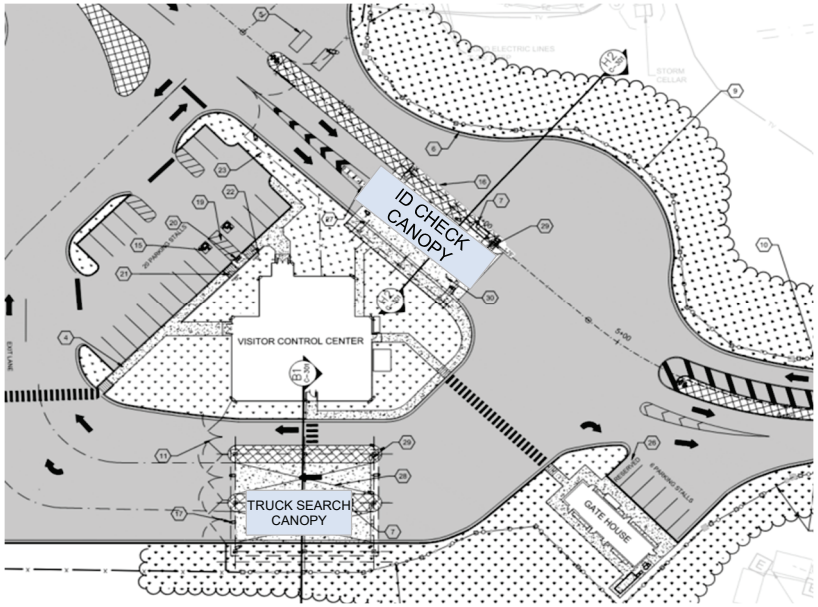
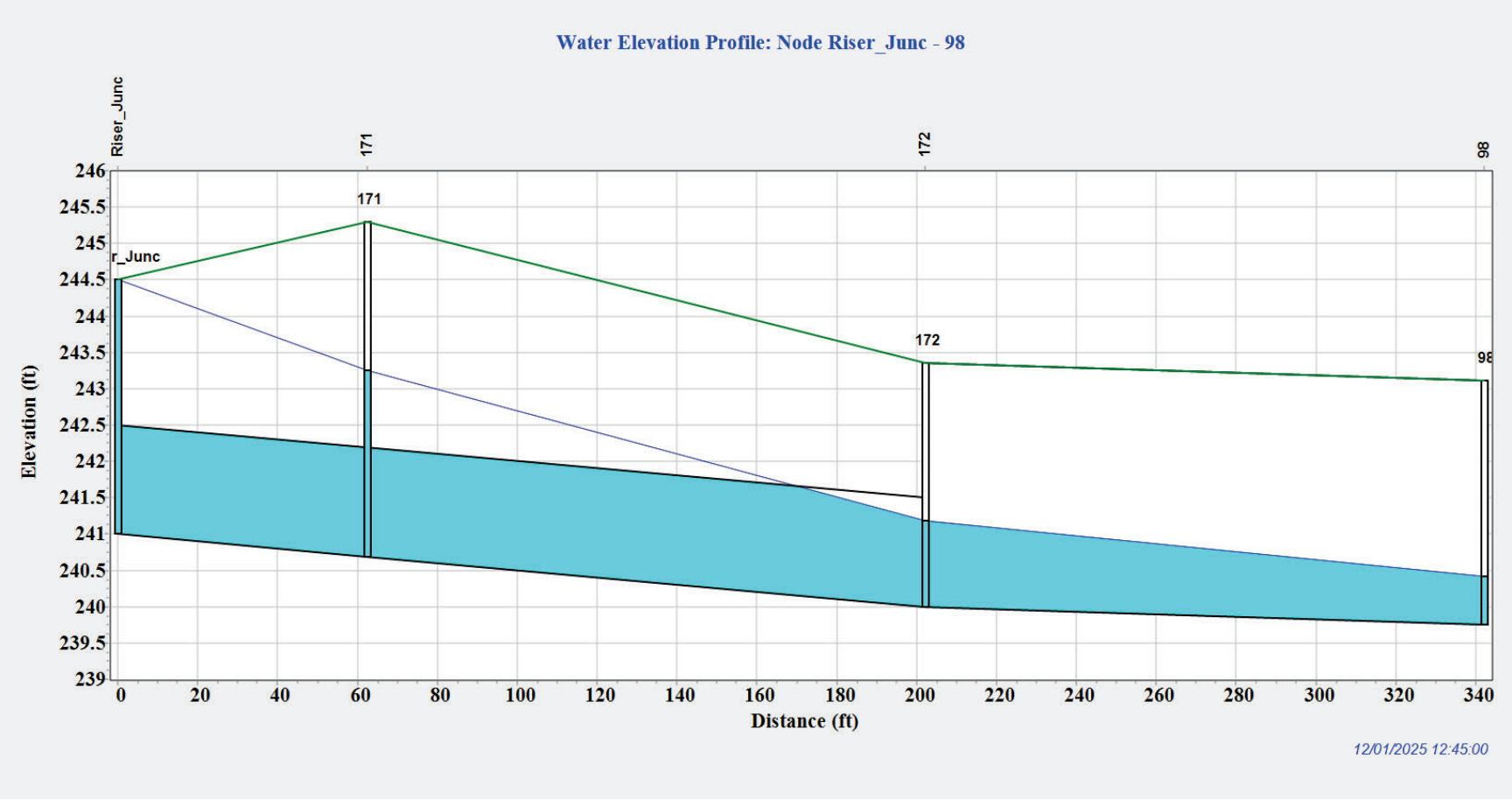


EXHIBIT Q: 100-YEAR WATER SURFACE PROFILE IN THE EXISTING OUTFALL IMMIEDIATE DOWNSTREAM OF THE POND OUTLET PIPE

PINE BLUFF ARSENAL -ACP PROJECT -POSTDEVELOPMENT WATER SURFACE PROFILE IN THE IMMIDIATE DOWNSTREAM OF THE POND OUTLET PIPE (100YEAR-24 HOUR STORM EVENT)



APPENDIX P
CYBERSECURITY CONTROLS

Starting Control Set and Tailoring Recommendations

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
AC-1	ACCESS CONTROL POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. An access control policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the access control policy and associated access controls; and b. Reviews and updates the current: 1. Access control policy [Assignment: organization-defined frequency]; and 2. Access control procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AC-2	ACCOUNT MANAGEMENT	The organization: a. Identifies and selects the following types of information system accounts to support organizational missions/business functions: [Assignment: organization-defined information system account types]; b. Assigns account managers for information system accounts; c. Establishes conditions for group and role membership; d. Specifies authorized users of the information system, group and role membership, and access authorizations (i.e., privileges) and other attributes (as required) for each account; e. Requires approvals by [Assignment: organization-defined personnel or roles] for requests to create information system accounts; f. Creates, enables, modifies, disables, and removes information system accounts in accordance with [Assignment: organization-defined procedures or conditions]; g. Monitors the use of information system accounts; h. Notifies account managers: 1. When accounts are no longer required; 2. When users are terminated or transferred; and 3. When individual information system usage or need-to-know changes; i. Authorizes access to the information system based on: 1. A valid access authorization; 2. Intended system usage; and 3. Other attributes as required by the organization or associated missions/business functions; j. Reviews accounts for compliance with account management requirements [Assignment: organization-defined frequency]; and k. Establishes a process for reissuing shared/group account credentials (if deployed) when individuals are removed from the group.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AC-3	ACCESS ENFORCEMENT	The information system enforces approved authorizations for logical access to information and system resources in accordance with applicable access control policies.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AC-7	UNSUCCESSFUL LOGIN ATTEMPTS	The information system: a. Enforces a limit of [Assignment: organization-defined number] consecutive invalid logon attempts by a user during a [Assignment: organization-defined time period]; and b. Automatically [Selection: locks the account/node for an [Assignment: organization-defined time period]; locks the account/node until released by an administrator; delays next logon prompt according to [Assignment: organization-defined delay algorithm]] when the maximum number of unsuccessful attempts is exceeded.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AC-8	SYSTEM USE NOTIFICATION	The information system: a. Displays to users [Assignment: organization-defined system use notification message or banner] before granting access to the system that provides privacy and security notices consistent with applicable federal laws, Executive Orders, directives, policies, regulations, standards, and guidance and states that: 1. Users are accessing a U.S. Government information system; 2. Information system usage may be monitored, recorded, and subject to audit; 3. Unauthorized use of the information system is prohibited and subject to criminal and civil penalties; and 4. Use of the information system indicates consent to monitoring and recording; b. Retains the notification message or banner on the screen until users acknowledge the usage conditions and take explicit actions to log on to or further access the information system; and c. For publicly accessible systems: 1. Displays system use information [Assignment: organization-defined conditions], before granting further access; 2. Displays references, if any, to monitoring, recording, or auditing that are consistent with privacy accommodations for such systems that generally prohibit those activities; and 3. Includes a description of the authorized uses of the system.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AC-14	PERMITTED ACTIONS WITHOUT IDENTIFICATION OR AUTHENTICATION	The organization: a. Identifies [Assignment: organization-defined user actions] that can be performed on the information system without identification or authentication consistent with organizational missions/business functions; and b. Documents and provides supporting rationale in the security plan for the information system, user actions not requiring identification or authentication.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AC-17	REMOTE ACCESS	The organization: a. Establishes and documents usage restrictions, configuration/connection requirements, and implementation guidance for each type of remote access allowed; and b. Authorizes remote access to the information system prior to allowing such connections.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AC-18	WIRELESS ACCESS	The organization: a. Establishes usage restrictions, configuration/connection requirements, and implementation guidance for wireless access; and b. Authorizes wireless access to the information system prior to allowing such connections.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AC-19	ACCESS CONTROL FOR MOBILE DEVICES	The organization: a. Establishes usage restrictions, configuration requirements, connection requirements, and implementation guidance for organization-controlled mobile devices; and b. Authorizes the connection of mobile devices to organizational information systems.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
AC-20	USE OF EXTERNAL INFORMATION SYSTEMS	The organization establishes terms and conditions, consistent with any trust relationships established with other organizations owning, operating, and/or maintaining external information systems, allowing authorized individuals to: a. Access the information system from external information systems; and b. Process, store, or transmit organization-controlled information using external information systems.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AC-21	INFORMATION SHARING	The organization: a. Facilitates information sharing by enabling authorized users to determine whether access authorizations assigned to the sharing partner match the access restrictions on the information for [Assignment: organization-defined information sharing circumstances where user discretion is required]; and b. Employs [Assignment: organization-defined automated mechanisms or manual processes] to assist users in making information sharing/collaboration decisions.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AC-22	PUBLICLY ACCESSIBLE CONTENT	The organization: a. Designates individuals authorized to post information onto a publicly accessible information system; b. Trains authorized individuals to ensure that publicly accessible information does not contain nonpublic information; c. Reviews the proposed content of information prior to posting onto the publicly accessible information system to ensure that nonpublic information is not included; and d. Reviews the content on the publicly accessible information system for nonpublic information [Assignment: organization-defined frequency] and removes such information, if discovered.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AT-1	SECURITY AWARENESS AND TRAINING POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A security awareness and training policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the security awareness and training policy and associated security awareness and training controls; and b. Reviews and updates the current: 1. Security awareness and training policy [Assignment: organization-defined frequency]; and 2. Security awareness and training procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AT-2	SECURITY AWARENESS TRAINING	The organization provides basic security awareness training to information system users (including managers, senior executives, and contractors): a. As part of initial training for new users; b. When required by information system changes; and c. [Assignment: organization-defined frequency] thereafter.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AT-3	ROLE-BASED SECURITY TRAINING	The organization provides role-based security training to personnel with assigned security roles and responsibilities: a. Before authorizing access to the information system or performing assigned duties; b. When required by information system changes; and c. [Assignment: organization-defined frequency] thereafter.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AT-4	SECURITY TRAINING RECORDS	The organization: a. Documents and monitors individual information system security training activities including basic security awareness training and specific information system security training; and b. Retains individual training records for [Assignment: organization-defined time period].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AU-1	AUDIT AND ACCOUNTABILITY POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. An audit and accountability policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the audit and accountability policy and associated audit and accountability controls; and b. Reviews and updates the current: 1. Audit and accountability policy [Assignment: organization-defined frequency]; and 2. Audit and accountability procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AU-2	AUDIT EVENTS	The organization: a. Determines that the information system is capable of auditing the following events: [Assignment: organization-defined auditable events]; b. Coordinates the security audit function with other organizational entities requiring audit-related information to enhance mutual support and to help guide the selection of auditable events; c. Provides a rationale for why the auditable events are deemed to be adequate to support after-the-fact investigations of security incidents; and d. Determines that the following events are to be audited within the information system: [Assignment: organization-defined audited events (the subset of the auditable events defined in AU-2 a.) along with the frequency of (or situation requiring) auditing for each identified event].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AU-3	CONTENT OF AUDIT RECORDS	The information system generates audit records containing information that establishes what type of event occurred, when the event occurred, where the event occurred, the source of the event, the outcome of the event, and the identity of any individuals or subjects associated with the event.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AU-4	AUDIT STORAGE CAPACITY	The organization allocates audit record storage capacity in accordance with [Assignment: organization-defined audit record storage requirements].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AU-4(1)	AUDIT STORAGE CAPACITY | TRANSFER TO ALTERNATE STORAGE	The information system off-loads audit records [Assignment: organization-defined frequency] onto a different system or media than the system being audited.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AU-5	RESPONSE TO AUDIT PROCESSING FAILURES	The information system: a. Alerts [Assignment: organization-defined personnel or roles] in the event of an audit processing failure; and b. Takes the following additional actions: [Assignment: organization-defined actions to be taken (e.g., shut down information system, overwrite oldest audit records, stop generating audit records)].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AU-6	AUDIT REVIEW, ANALYSIS, AND REPORTING	The organization: a. Reviews and analyzes information system audit records [Assignment: organization-defined frequency] for indications of [Assignment: organization-defined inappropriate or unusual activity]; and b. Reports findings to [Assignment: organization-defined personnel or roles].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
AU-8	TIME STAMPS	The information system: a. Uses internal system clocks to generate time stamps for audit records; and b. Records time stamps for audit records that can be mapped to Coordinated Universal Time (UTC) or Greenwich Mean Time (GMT) and meets [Assignment: organization-defined granularity of time measurement].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AU-9	PROTECTION OF AUDIT INFORMATION	The information system protects audit information and audit tools from unauthorized access, modification, and deletion.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AU-11	AUDIT RECORD RETENTION	The organization retains audit records for [Assignment: organization-defined time period consistent with records retention policy] to provide support for after-the-fact investigations of security incidents and to meet regulatory and organizational information retention requirements.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AU-12	AUDIT GENERATION	The information system: a. Provides audit record generation capability for the auditable events defined in AU-2 at [Assignment: organization-defined information system components]; b. Allows [Assignment: organization-defined personnel or roles] to select which auditable events are to be audited by specific components of the information system; and c. Generates audit records for the audited events defined in AU-2 with the content defined in AU-3.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CA-1	SECURITY ASSESSMENT AND AUTHORIZATION POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A security assessment and authorization policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the security assessment and authorization policy and associated security assessment and authorization controls; and b. Reviews and updates the current: 1. Security assessment and authorization policy [Assignment: organization-defined frequency]; and 2. Security assessment and authorization procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CA-2	SECURITY ASSESSMENTS	The organization: a. Develops a security assessment plan that describes the scope of the assessment including: 1. Security controls and control enhancements under assessment; 2. Assessment procedures to be used to determine security control effectiveness; and 3. Assessment environment, assessment team, and assessment roles and responsibilities; b. Assesses the security controls in the information system and its environment of operation [Assignment: organization-defined frequency] to determine the extent to which the controls are implemented correctly, operating as intended, and producing the desired outcome with respect to meeting established security requirements; c. Produces a security assessment report that documents the results of the assessment; and d. Provides the results of the security control assessment to [Assignment: organization-defined individuals or roles].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CA-3	SYSTEM INTERCONNECTIONS	The organization: a. Authorizes connections from the information system to other information systems through the use of Interconnection Security Agreements; b. Documents, for each interconnection, the interface characteristics, security requirements, and the nature of the information communicated; and c. Reviews and updates Interconnection Security Agreements [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CA-5	PLAN OF ACTION AND MILESTONES	The organization: a. Develops a plan of action and milestones for the information system to document the organization's planned remedial actions to correct weaknesses or deficiencies noted during the assessment of the security controls and to reduce or eliminate known vulnerabilities in the system; and b. Updates existing plan of action and milestones [Assignment: organization-defined frequency] based on the findings from security controls assessments, security impact analyses, and continuous monitoring activities.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CA-6	SECURITY AUTHORIZATION	The organization: a. Assigns a senior-level executive or manager as the authorizing official for the information system; b. Ensures that the authorizing official authorizes the information system for processing before commencing operations; and c. Updates the security authorization [Assignment: organization - defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CA-7	CONTINUOUS MONITORING	The organization develops a continuous monitoring strategy and implements a continuous monitoring program that includes: a. Establishment of [Assignment: organization-defined metrics] to be monitored; b. Establishment of [Assignment: organization-defined frequencies] for monitoring and [Assignment: organization-defined frequencies] for assessments supporting such monitoring; c. Ongoing security control assessments in accordance with the organizational continuous monitoring strategy; d. Ongoing security status monitoring of organization-defined metrics in accordance with the organizational continuous monitoring strategy; e. Correlation and analysis of security-related information generated by assessments and monitoring; f. Response actions to address results of the analysis of security-related information; and g. Reporting the security status of organization and the information system to [Assignment: organization-defined personnel or roles] [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CA-9	INTERNAL SYSTEM CONNECTIONS	The organization: a. Authorizes internal connections of [Assignment: organization-defined information system components or classes of components] to the information system; and b. Documents, for each internal connection, the interface characteristics, security requirements, and the nature of the information communicated.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
CM-1	CONFIGURATION MANAGEMENT POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A configuration management policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the configuration management policy and associated configuration management controls; and b. Reviews and updates the current: 1. Configuration management policy [Assignment: organization-defined frequency]; and 2. Configuration management procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CM-2	BASELINE CONFIGURATION	The organization develops, documents, and maintains under configuration control, a current baseline configuration of the information system.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CM-4	SECURITY IMPACT ANALYSIS	The organization analyzes changes to the information system to determine potential security impacts prior to change implementation.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CM-6	CONFIGURATION SETTINGS	The organization: a. Establishes and documents configuration settings for information technology products employed within the information system using [Assignment: organization-defined security configuration checklists] that reflect the most restrictive mode consistent with operational requirements; b. Implements the configuration settings; c. Identifies, documents, and approves any deviations from established configuration settings for [Assignment: organization - defined information system components] based on [Assignment: organization-defined operational requirements]; and d. Monitors and controls changes to the configuration settings in accordance with organizational policies and procedures.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CM-7	LEAST FUNCTIONALITY	The organization: a. Configures the information system to provide only essential capabilities; and b. Prohibits or restricts the use of the following functions, ports, protocols, and/or services: [Assignment: organization-defined prohibited or restricted functions, ports, protocols, and/or services].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CM-7(1)	LEAST FUNCTIONALITY | PERIODIC REVIEW	The organization: (a) Reviews the information system [Assignment: organization-defined frequency] to identify unnecessary and/or nonsecure functions, ports, protocols, and services; and (b) Disables [Assignment: organization-defined functions, ports, protocols, and services within the information system deemed to be unnecessary and/or nonsecure].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CM-8	INFORMATION SYSTEM COMPONENT INVENTORY	The organization: a. Develops and documents an inventory of information system components that: 1. Accurately reflects the current information system; 2. Includes all components within the authorization boundary of the information system; 3. Is at the level of granularity deemed necessary for tracking and reporting; and 4. Includes [Assignment: organization-defined information deemed necessary to achieve effective information system component accountability]; and b. Reviews and updates the information system component inventory [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CM-10	SOFTWARE USAGE RESTRICTIONS	The organization: a. Uses software and associated documentation in accordance with contract agreements and copyright laws; b. Tracks the use of software and associated documentation protected by quantity licenses to control copying and distribution; and c. Controls and documents the use of peer-to-peer file sharing technology to ensure that this capability is not used for the unauthorized distribution, display, performance, or reproduction of copyrighted work.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CM-11	USER-INSTALLED SOFTWARE	The organization: a. Establishes [Assignment: organization-defined policies] governing the installation of software by users; b. Enforces software installation policies through [Assignment: organization-defined methods]; and c. Monitors policy compliance at [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CP-1	CONTINGENCY PLANNING POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A contingency planning policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the contingency planning policy and associated contingency planning controls; and b. Reviews and updates the current: 1. Contingency planning policy [Assignment: organization-defined frequency]; and 2. Contingency planning procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
CP-2	CONTINGENCY PLAN	The organization: a. Develops a contingency plan for the information system that: 1. Identifies essential missions and business functions and associated contingency requirements; 2. Provides recovery objectives, restoration priorities, and metrics; 3. Addresses contingency roles, responsibilities, assigned individuals with contact information; 4. Addresses maintaining essential missions and business functions despite an information system disruption, compromise, or failure; 5. Addresses eventual, full information system restoration without deterioration of the security safeguards originally planned and implemented; and 6. Is reviewed and approved by [Assignment: organization-defined personnel or roles]; b. Distributes copies of the contingency plan to [Assignment: organization-defined key contingency personnel (identified by name and/or by role) and organizational elements]; c. Coordinates contingency planning activities with incident handling activities; d. Reviews the contingency plan for the information system [Assignment: organization-defined frequency]; e. Updates the contingency plan to address changes to the organization, information system, or environment of operation and problems encountered during contingency plan implementation, execution, or testing; f. Communicates contingency plan changes to [Assignment: organization-defined key contingency personnel (identified by name and/or by role) and organizational elements]; and g. Protects the contingency plan from unauthorized disclosure and modification.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CP-3	CONTINGENCY TRAINING	The organization provides contingency training to information system users consistent with assigned roles and responsibilities: a. Within [Assignment: organization-defined time period] of assuming a contingency role or responsibility; b. When required by information system changes; and c. [Assignment: organization-defined frequency] thereafter.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CP-4	CONTINGENCY PLAN TESTING	The organization: a. Tests the contingency plan for the information system [Assignment: organization-defined frequency] using [Assignment: organization-defined tests] to determine the effectiveness of the plan and the organizational readiness to execute the plan; b. Reviews the contingency plan test results; and c. Initiates corrective actions, if needed.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CP-9	INFORMATION SYSTEM BACKUP	The organization: a. Conducts backups of user-level information contained in the information system [Assignment: organization-defined frequency consistent with recovery time and recovery point objectives]; b. Conducts backups of system-level information contained in the information system [Assignment: organization-defined frequency consistent with recovery time and recovery point objectives]; c. Conducts backups of information system documentation including security-related documentation [Assignment: organization-defined frequency consistent with recovery time and recovery point objectives]; and d. Protects the confidentiality, integrity, and availability of backup information at storage locations.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CP-10	INFORMATION SYSTEM RECOVERY AND RECONSTITUTION	The organization provides for the recovery and reconstitution of the information system to a known state after a disruption, compromise, or failure.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CP-12	SAFE MODE	The information system, when [Assignment:organization-defined conditions] are detected, enters a safe mode of operation with [Assignment: organization-defined restrictions of safe mode of operation].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IA-1	IDENTIFICATION AND AUTHENTICATION POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. An identification and authentication policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the identification and authentication policy and associated identification and authentication controls; and b. Reviews and updates the current: 1. Identification and authentication policy [Assignment: organization-defined frequency]; and 2. Identification and authentication procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IA-2	IDENTIFICATION AND AUTHENTICATION (ORGANIZATIONAL USERS)	The information system uniquely identifies and authenticates organizational users (or processes acting on behalf of organizational users).	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IA-2(1)	IDENTIFICATION AND AUTHENTICATION | NETWORK ACCESS TO PRIVILEGED ACCOUNTS	The information system implements multifactor authentication for network access to privileged accounts.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IA-2(12)	IDENTIFICATION AND AUTHENTICATION | ACCEPTANCE OF PIV CREDENTIALS	The information system accepts and electronically verifies Personal Identity Verification (PIV) credentials.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IA-3	DEVICE IDENTIFICATION AND AUTHENTICATION	The information system uniquely identifies and authenticates [Assignment: organization defined specific and/or types of devices] before establishing a [Selection (one or more): local; remote; network] connection.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IA-4	IDENTIFIER MANAGEMENT	The organization manages information system identifiers by: a. Receiving authorization from [Assignment: organization-defined personnel] to assign an individual, group, role, or device identifier; b. Selecting an identifier that identifies an individual, group, role, or device; c. Assigning the identifier to the intended individual, group, role, or device; d. Preventing reuse of identifiers for [Assignment: organization-defined time period]; and e. Disabling the identifier after [Assignment: organization-defined time period of inactivity].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
IA-5	AUTHENTICATOR MANAGEMENT	The organization manages information system authenticators by: a. Verifying, as part of the initial authenticator distribution, the identity of the individual, group, role, or device receiving the authenticator; b. Establishing initial authenticator content for authenticators defined by the organization; c. Ensuring that authenticators have sufficient strength of mechanism for their intended use; d. Establishing and implementing administrative procedures for initial authenticator distribution, for lost/compromised or damaged authenticators, and for revoking authenticators; e. Changing default content of authenticators prior to information system installation; f. Establishing minimum and maximum lifetime restrictions and reuse conditions for authenticators; g. Changing/refreshing authenticators [Assignment: organization-defined time period by authenticator type]; h. Protecting authenticator content from unauthorized disclosure and modification; i. Requiring individuals to take, and having devices implement, specific security safeguards to protect authenticators; and j. Changing authenticators for group/role accounts when membership to those accounts changes.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IA-5(1)	AUTHENTICATOR MANAGEMENT | PASSWORD-BASED AUTHENTICATION	The information system, for password-based authentication: (a) Enforces minimum password complexity of [Assignment: organization-defined requirements for case sensitivity, number of characters, mix of upper-case letters, lower-case letters, numbers, and special characters, including minimum requirements for each type]; (b) Enforces at least the following number of changed characters when new passwords are created: [Assignment: organization-defined number]; (c) Stores and transmits only cryptographically-protected passwords; (d) Enforces password minimum and maximum lifetime restrictions of [Assignment: organization-defined numbers for lifetime minimum, lifetime maximum]; (e) Prohibits password reuse for [Assignment: organization-defined number] generations; and (f) Allows the use of a temporary password for system logons with an immediate change to a permanent password.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IA-5(11)	AUTHENTICATOR MANAGEMENT | HARDWARE TOKEN-BASED AUTHENTICATION	The information system, for hardware token-based authentication, employs mechanisms that satisfy [Assignment: organization-defined token quality requirements].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IA-6	AUTHENTICATOR FEEDBACK	The information system obscures feedback of authentication information during the authentication process to protect the information from possible exploitation/use by unauthorized individuals.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IA-7	CRYPTOGRAPHIC MODULE AUTHENTICATION	The information system implements mechanisms for authentication to a cryptographic module that meet the requirements of applicable federal laws, Executive Orders, directives, policies, regulations, standards, and guidance for such authentication.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IA-8	IDENTIFICATION AND AUTHENTICATION (NON-ORGANIZATIONAL USERS)	The information system uniquely identifies and authenticates non-organizational users (or processes acting on behalf of non-organizational users).	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IA-8(1)	IDENTIFICATION AND AUTHENTICATION | ACCEPTANCE OF PIV CREDENTIALS FROM OTHER AGENCIES	The information system accepts and electronically verifies Personal Identity Verification (PIV) credentials from other federal agencies.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IA-8(2)	IDENTIFICATION AND AUTHENTICATION | ACCEPTANCE OF THIRD-PARTY CREDENTIALS	The information system accepts only FICAM-approved third-party credentials.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IA-8(3)	IDENTIFICATION AND AUTHENTICATION | USE OF FICAM-APPROVED PRODUCTS	The organization employs only FICAM-approved information system components in [Assignment: organization-defined information systems] to accept third-party credentials.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IA-8(4)	IDENTIFICATION AND AUTHENTICATION | USE OF FICAM-ISSUED PROFILES	The information system conforms to FICAM-issued profiles.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IR-1	INCIDENT RESPONSE POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. An incident response policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the incident response policy and associated incident response controls; and b. Reviews and updates the current: 1. Incident response policy [Assignment: organization-defined frequency]; and 2. Incident response procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IR-2	INCIDENT RESPONSE TRAINING	The organization provides incident response training to information system users consistent with assigned roles and responsibilities: a. Within [Assignment: organization-defined time period] of assuming an incident response role or responsibility; b. When required by information system changes; and c. [Assignment: organization-defined frequency] thereafter.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IR-4	INCIDENT HANDLING	The organization: a. Implements an incident handling capability for security incidents that includes preparation, detection and analysis, containment, eradication, and recovery; b. Coordinates incident handling activities with contingency planning activities; and c. Incorporates lessons learned from ongoing incident handling activities into incident response procedures, training, and testing/exercises, and implements the resulting changes accordingly.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IR-5	INCIDENTMONITORING	The organization tracks and documents information system security incidents.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
IR-6	INCIDENT REPORTING	The organization: a. Requires personnel to report suspected security incidents to the organizational incident response capability within [Assignment: organization-defined time-period]; and b. Reports security incident information to [Assignment: organization-defined authorities].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IR-7	INCIDENT RESPONSE ASSISTANCE	The organization provides an incident response support resource, integral to the organizational incident response capability, that offers advice and assistance to users of the information system for the handling and reporting of security incidents.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IR-8	INCIDENT RESPONSE PLAN	The organization: a. Develops an incident response plan that: 1. Provides the organization with a roadmap for implementing its incident response capability; 2. Describes the structure and organization of the incident response capability; 3. Provides a high-level approach for how the incident response capability fits into the overall organization; 4. Meets the unique requirements of the organization, which relate to mission, size, structure, and functions; 5. Defines reportable incidents; 6. Provides metrics for measuring the incident response capability within the organization; 7. Defines the resources and management support needed to effectively maintain and mature an incident response capability; and 8. Is reviewed and approved by [Assignment: organization-defined personnel or roles]; b. Distributes copies of the incident response plan to [Assignment: organization-defined incident response personnel (identified by name and/or by role) and organizational elements]; c. Reviews the incident response plan [Assignment: organization-defined frequency]; d. Updates the incident response plan to address system/organizational changes or problems encountered during plan implementation, execution, or testing; e. Communicates incident response plan changes to [Assignment: organization-defined incident response personnel (identified by name and/or by role) and organizational elements]; and f. Protects the incident response plan from unauthorized disclosure and modification.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
MA-1	SYSTEM MAINTENANCE POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A system maintenance policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the system maintenance policy and associated system maintenance controls; and b. Reviews and updates the current: 1. System maintenance policy [Assignment: organization-defined frequency]; and 2. System maintenance procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
MA-2	CONTROLLED MAINTENANCE	The organization: a. Schedules, performs, documents, and reviews records of, maintenance and repairs on information system components in accordance with manufacturer or vendor specifications and /or organizational requirements; b. Approves and monitors all maintenance activities, whether performed on site or remotely and whether the equipment is serviced on site or removed to another location; c. Requires that [Assignment: organization-defined personnel] explicitly approve the removal of the information system or system components from organizational facilities for off-site maintenance or repairs; d. Sanitizes equipment to remove all information from associated media prior to removal from organizational facilities for off-site maintenance or repairs; e. Checks all potentially impacted security controls to verify that the controls are still functioning properly following maintenance or repair actions; and f. Includes [Assignment: organization-defined maintenance-related information] in organizational maintenance records.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
MA-4	NONLOCAL MAINTENANCE	The organization: a. Approves and monitors nonlocal maintenance and diagnostic activities; b. Allows the use of nonlocal maintenance and diagnostic tools only as consistent with organizational policy and documented in the security plan for the information system; c. Employs strong authenticators in the establishment of nonlocal maintenance and diagnostic sessions; d. Maintains records for nonlocal maintenance and diagnostic activities; and e. Terminates session and network connections when nonlocal maintenance is completed.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
MA-5	MAINTENANCE PERSONNEL	The organization: a. Establishes a process for maintenance personnel authorization and maintains a list of authorized maintenance organizations or personnel; b. Ensures that non-escorted personnel performing maintenance on the information system have required access authorizations; and c. Designates organizational personnel with required access authorizations and technical competence to supervise the maintenance activities of personnel who do not possess the required access authorizations.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
MP-1	MEDIA PROTECTION POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A media protection policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the media protection policy and associated media protection controls; and b. Reviews and updates the current: 1. Media protection policy [Assignment: organization-defined frequency]; and 2. Media protection procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
MP-2	MEDIA ACCESS	The organization restricts access to [Assignment: organization-defined types of digital and/or non-digital media] to [Assignment: organization-defined personnel or roles].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
MP-6	MEDIA SANITIZATION	The organization: a. Sanitizes [Assignment: organization-defined information system media] prior to disposal, release out of organizational control, or release for reuse using [Assignment: organization-defined sanitization techniques and procedures] in accordance with applicable federal and organizational standards and policies; and b. Employs sanitization mechanisms with the strength and integrity commensurate with the security category or classification of the information.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
MP-7	MEDIA USE	The organization [Selection: restricts; prohibits] the use of [Assignment: organization-defined types of information system media] on [Assignment: organization-defined information systems or system components] using [Assignment: organization-defined security safeguards].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PE-1	PHYSICAL AND ENVIRONMENTAL PROTECTION POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A physical and environmental protection policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the physical and environmental protection policy and associated physical and environmental protection controls; and b. Reviews and updates the current: 1. Physical and environmental protection policy [Assignment: organization-defined frequency]; and 2. Physical and environmental protection procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PE-2	PHYSICAL ACCESS AUTHORIZATIONS	The organization: a. Develops, approves, and maintains a list of individuals with authorized access to the facility where the information system resides; b. Issues authorization credentials for facility access; c. Reviews the access list detailing authorized facility access by individuals [Assignment: organization-defined frequency]; and d. Removes individuals from the facility access list when access is no longer required.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PE-3	PHYSICAL ACCESS CONTROL	The organization: a. Enforces physical access authorizations at [Assignment: organization-defined entry/exit points to the facility where the information system resides] by; 1. Verifying individual access authorizations before granting access to the facility; and 2. Controlling ingress/egress to the facility using [Selection (one or more): [Assignment: organization-defined physical access control systems/devices]; guards]; b. Maintains physical access audit logs for [Assignment: organization-defined entry/exit points]; c. Provides [Assignment: organization-defined security safeguards] to control access to areas within the facility officially designated as publicly accessible; d. Escorts visitors and monitors visitor activity [Assignment: organization-defined circumstances requiring visitor escorts and monitoring]; e. Secures keys, combinations, and other physical access devices; f. Inventories [Assignment: organization-defined physical access devices] every [Assignment: organization-defined frequency]; and g. Changes combinations and keys [Assignment: organization-defined frequency] and/or when keys are lost, combinations are compromised, or individuals are transferred or terminated.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PE-6	MONITORING PHYSICAL ACCESS	The organization: a. Monitors physical access to the facility where the information system resides to detect and respond to physical security incidents; b. Reviews physical access logs [Assignment: organization-defined frequency] and upon occurrence of [Assignment: organization-defined events or potential indications of events]; and c. Coordinates results of reviews and investigations with the organizational incident response capability.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PE-8	VISITOR ACCESS RECORDS	The organization: a. Maintains visitor access records to the facility where the information system resides for [Assignment: organization-defined time period]; and b. Reviews visitor access records [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PE-11	EMERGENCY POWER	The organization provides a short-term uninterruptible power supply to facilitate [Selection (one or more): an orderly shutdown of the information system; transition of the information system to long-term alternate power] in the event of a primary power source loss.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PE-11(1)	EMERGENCY POWER | LONG-TERM ALTERNATE POWER SUPPLY - MINIMAL OPERATIONAL CAPABILITY	The organization provides a long-term alternate power supply for the information system that is capable of maintaining minimally required operational capability in the event of an extended loss of the primary power source.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PE-12	EMERGENCY LIGHTING	The organization employs and maintains automatic emergency lighting for the information system that activates in the event of a power outage or disruption and that covers emergency exits and evacuation routes within the facility.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PE-13	FIRE PROTECTION	The organization employs and maintains fire suppression and detection devices/systems for the information system that are supported by an independent energy source.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PE-14	TEMPERATURE AND HUMIDITY CONTROLS	The organization: a. Maintains temperature and humidity levels within the facility where the information system resides at [Assignment: organization - defined acceptable levels]; and b. Monitors temperature and humidity levels [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PE-15	WATER DAMAGE PROTECTION	The organization protects the information system from damage resulting from water leakage by providing master shutoff or isolation valves that are accessible, working properly, and known to key personnel.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PE-16	DELIVERY AND REMOVAL	The organization authorizes, monitors, and controls [Assignment: organization-defined types of information system components] entering and exiting the facility and maintains records of those items.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
PL-1	SECURITY PLANNING POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A security planning policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the security planning policy and associated security planning controls; and b. Reviews and updates the current: 1. Security planning policy [Assignment: organization-defined frequency]; and 2. Security planning procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PL-2	SYSTEM SECURITY PLAN	The organization: a. Develops a security plan for the information system that: 1. Is consistent with the organization's enterprise architecture; 2. Explicitly defines the authorization boundary for the system; 3. Describes the operational context of the information system in terms of missions and business processes; 4. Provides the security categorization of the information system including supporting rationale; 5. Describes the operational environment for the information system and relationships with or connections to other information systems; 6. Provides an overview of the security requirements for the system; 7. Identifies any relevant overlays, if applicable 8. Describes the security controls in place or planned for meeting those requirements including a rationale for the tailoring decisions; and 9. Is reviewed and approved by the authorizing official or designated representative prior to plan implementation; b. Distributes copies of the security plan and communicates subsequent changes to the plan to [Assignment: organization-defined personnel or roles]; c. Reviews the security plan for the information system [Assignment: organization-defined frequency]; d. Updates the plan to address changes to the information system/environment of operation or problems identified during plan implementation or security control assessments; and e. Protects the security plan from unauthorized disclosure and modification.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PL-2(3)	SYSTEM SECURITY PLAN | PLAN / COORDINATE WITH OTHER ORGANIZATIONAL ENTITIES	The organization plans and coordinates security-related activities affecting the information system with [Assignment: organization-defined individuals or groups] before conducting such activities in order to reduce the impact on other organizational entities.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PL-4	RULES OF BEHAVIOR	The organization: a. Establishes and makes readily available to individuals requiring access to the information system, the rules that describe their responsibilities and expected behavior with regard to information and information system usage; b. Receives a signed acknowledgment from such individuals, indicating that they have read, understand, and agree to abide by the rules of behavior, before authorizing access to information and the information system; c. Reviews and updates the rules of behavior [Assignment: organization-defined frequency]; and d. Requires individuals who have signed a previous version of the rules of behavior to read and resign when the rules of behavior are revised/updated.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PS-1	PERSONNEL SECURITY POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A personnel security policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the personnel security policy and associated personnel security controls; and b. Reviews and updates the current: 1. Personnel security policy [Assignment: organization-defined frequency]; and 2. Personnel security procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PS-2	POSITION RISK DESIGNATION	The organization: a. Assigns a risk designation to all organizational positions; b. Establishes screening criteria for individuals filling those positions; and c. Reviews and updates position risk designations [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PS-3	PERSONNEL SCREENING	The organization: a. Screens individuals prior to authorizing access to the information system; and b. Rescreens individuals according to [Assignment: organization -defined conditions requiring rescreening and, where re-screening is so indicated, the frequency of such rescreening].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PS-4	PERSONNEL TERMINATION	The organization, upon termination of individual employment: a. Disables information system access within [Assignment: organization-defined time period]; b. Terminates/revokes any authenticators/credentials associated with the individual; c. Conducts exit interviews that include a discussion of [Assignment: organization-defined information security topics]; d. Retrieves all security-related organizational information system-related property; e. Retains access to organizational information and information systems formerly controlled by terminated individual; and f. Notifies [Assignment: organization-defined personnel or roles] within [Assignment: organization-defined time period].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PS-5	PERSONNEL TRANSFER	The organization: a. Reviews and confirms ongoing operational need for current logical and physical access authorizations to information systems/facilities when individuals are reassigned or transferred to other positions within the organization; b. Initiates [Assignment: organization-defined transfer or reassignment actions] within [Assignment: organization-defined time period following the formal transfer action]; c. Modifies access authorization as needed to correspond with any changes in operational need due to reassignment or transfer; and d. Notifies [Assignment: organization-defined personnel or roles] within [Assignment: organization-defined time period].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
PS-6	ACCESS AGREEMENTS	The organization: a. Develops and documents access agreements for organizational information systems; b. Reviews and updates the access agreements [Assignment: organization-defined frequency]; and c. Ensures that individuals requiring access to organizational information and information systems: 1. Sign appropriate access agreements prior to being granted access; and 2. Re-sign access agreements to maintain access to organizational information systems when access agreements have been updated or [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PS-7	THIRD-PARTY PERSONNEL SECURITY	The organization: a. Establishes personnel security requirements including security roles and responsibilities for third-party providers; b. Requires third-party providers to comply with personnel security policies and procedures established by the organization; c. Documents personnel security requirements; d. Requires third-party providers to notify [Assignment: organization-defined personnel or roles] of any personnel transfers or terminations of third-party personnel who possess organizational credentials and/or badges, or who have information system privileges within [Assignment: organization-defined time period]; and e. Monitors provider compliance.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PS-8	PERSONNEL SANCTIONS	The organization: a. Employs a formal sanctions process for individuals failing to comply with established information security policies and procedures; and b. Notifies [Assignment: organization-defined personnel or roles] within [Assignment: organization-defined time period] when a formal employee sanctions process is initiated, identifying the individual sanctioned and the reason for the sanction.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
RA-1	RISK ASSESSMENT POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A risk assessment policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the risk assessment policy and associated risk assessment controls; and b. Reviews and updates the current: 1. Risk assessment policy [Assignment: organization-defined frequency]; and 2. Risk assessment procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
RA-2	SECURITY CATEGORIZATION	The organization: a. Categorizes information and the information system in accordance with applicable federal laws, Executive Orders, directives, policies, regulations, standards, and guidance; b. Documents the security categorization results (including supporting rationale) in the security plan for the information system; and c. Ensures that the security categorization decision is reviewed and approved by the authorizing official or authorizing official designated representative.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
RA-3	RISK ASSESSMENT	The organization: a. Conducts an assessment of risk, including the likelihood and magnitude of harm, from the unauthorized access, use, disclosure, disruption, modification, or destruction of the information system and the information it processes, stores, or transmits; b. Documents risk assessment results in [Selection: security plan; risk assessment report; [Assignment: organization-defined document]]; c. Reviews risk assessment results [Assignment: organization-defined frequency]; d. Disseminates risk assessment results to [Assignment: organization-defined personnel or roles]; and e. Updates the risk assessment [Assignment: organization-defined frequency] or whenever there are significant changes to the information system or environment of operation (including the identification of new threats and vulnerabilities), or other conditions that may impact the security state of the system.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
RA-5	VULNERABILITY SCANNING	The organization: a. Scans for vulnerabilities in the information system and hosted applications [Assignment: organization-defined frequency and/or randomly in accordance with organization-defined process] and when new vulnerabilities potentially affecting the system/applications are identified and reported; b. Employs vulnerability scanning tools and techniques that facilitate interoperability among tools and automate parts of the vulnerability management process by using standards for: 1. Enumerating platforms, software flaws, and improper configurations; 2. Formatting checklists and test procedures; and 3. Measuring vulnerability impact; c. Analyzes vulnerability scan reports and results from security control assessments; d. Remediates legitimate vulnerabilities [Assignment: organization-defined response times] in accordance with an organizational assessment of risk; and e. Shares information obtained from the vulnerability scanning process and security control assessments with [Assignment: organization-defined personnel or roles] to help eliminate similar vulnerabilities in other information systems (i.e., systemic weaknesses or deficiencies).	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SA-1	SYSTEM AND SERVICES ACQUISITION POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A system and services acquisition policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the system and services acquisition policy and associated system and services acquisition controls; and b. Reviews and updates the current: 1. System and services acquisition policy [Assignment: organization-defined frequency]; and 2. System and services acquisition procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
SA-2	ALLOCATION OF RESOURCES	The organization: a. Determines information security requirements for the information system or information system service in mission/business process planning; b. Determines, documents, and allocates the resources required to protect the information system or information system service as part of its capital planning and investment control process; and c. Establishes a discrete line item for information security in organizational programming and budgeting documentation	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SA-3	SYSTEM DEVELOPMENT LIFE CYCLE	The organization: a. Manages the information system using [Assignment: organization-defined system development life cycle] that incorporates information security considerations; b. Defines and documents information security roles and responsibilities throughout the system development life cycle; c. Identifies individuals having information security roles and responsibilities; and d. Integrates the organizational information security risk management process into system development life cycle activities.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SA-4	ACQUISITION PROCESS	The organization includes the following requirements, descriptions, and criteria, explicitly or by reference, in the acquisition contract for the information system, system component, or information system service in accordance with applicable federal laws, Executive Orders, directives, policies, regulations, standards, guidelines, and organizational mission/business needs: a. Security functional requirements; b. Security strength requirements; c. Security assurance requirements; d. Security-related documentation requirements; e. Requirements for protecting security-related documentation; f. Description of the information system development environment and environment in which the system is intended to operate; and g. Acceptance criteria.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SA-4(10)	ACQUISITION PROCESS | USE OF APPROVED PIV PRODUCTS	The organization employs only information technology products on the FIPS 201-approved products list for Personal Identity Verification (PIV) capability implemented within organizational information systems.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SA-5	INFORMATION SYSTEM DOCUMENTATION	The organization: a. Obtains administrator documentation for the information system, system component, or information system service that describes: 1. Secure configuration, installation, and operation of the system, component, or service; 2. Effective use and maintenance of security functions/mechanisms; and 3. Known vulnerabilities regarding configuration and use of administrative (i.e., privileged) functions; b. Obtains user documentation for the information system, system component, or information system service that describes: 1. User-accessible security functions/mechanisms and how to effectively use those security functions/mechanisms; 2. Methods for user interaction, which enables individuals to use the system, component, or service in a more secure manner; and 3. User responsibilities in maintaining the security of the system, component, or service; c. Documents attempts to obtain information system, system component, or information system service documentation when such documentation is either unavailable or nonexistent and [Assignment: organization-defined actions] in response; d. Protects documentation as required, in accordance with the risk management strategy; and e. Distributes documentation to [Assignment: organization-defined personnel or roles].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SA-9	EXTERNAL INFORMATION SYSTEM SERVICES	The organization: a. Requires that providers of external information system services comply with organizational information security requirements and employ [Assignment: organization-defined security controls] in accordance with applicable federal laws, Executive Orders, directives, policies, regulations, standards, and guidance; b. Defines and documents government oversight and user roles and responsibilities with regard to external information system services; and c. Employs [Assignment: organization-defined processes, methods, and techniques] to monitor security control compliance by external service providers on an ongoing basis.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SC-1	SYSTEM AND COMMUNICATIONS PROTECTION POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A system and communications protection policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the system and communications protection policy and associated system and communications protection controls; and b. Reviews and updates the current: 1. System and communications protection policy [Assignment: organization-defined frequency]; and 2. System and communications protection procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SC-5	DENIAL OF SERVICE PROTECTION	The information system protects against or limits the effects of the following types of denial of service attacks: [Assignment: organization-defined types of denial of service attacks or reference to source for such information] by employing [Assignment: organization-defined security safeguards].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SC-7	BOUNDARY PROTECTION	The information system: a. Monitors and controls communications at the external boundary of the system and at key internal boundaries within the system; b. Implements subnetworks for publicly accessible system components that are [Selection: physically; logically] separated from internal organizational networks; and c. Connects to external networks or information systems only through managed interfaces consisting of boundary protection devices arranged in accordance with an organizational security architecture.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SC-12	CRYPTOGRAPHIC KEY ESTABLISHMENT AND MANAGEMENT	The organization establishes and manages cryptographic keys for required cryptography employed within the information system in accordance with [Assignment: organization-defined requirements for key generation, distribution, storage, access, and destruction].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
SC-13	CRYPTOGRAPHIC PROTECTION	The information system implements [Assignment: organization-defined cryptographic uses and type of cryptography required for each use] in accordance with applicable federal laws, Executive Orders, directives, policies, regulations, and standards.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SC-15	COLLABORATIVE COMPUTING DEVICES	The information system: a. Prohibits remote activation of collaborative computing devices with the following exceptions: [Assignment: organization-defined exceptions where remote activation is to be allowed]; and b. Provides an explicit indication of use to users physically present at the devices.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SC-20	SECURE NAME / ADDRESS RESOLUTION SERVICE (AUTHORITATIVE SOURCE)	The information system: a. Provides additional data origin authentication and integrity verification artifacts along with the authoritative name resolution data the system returns in response to external name/address resolution queries; and b. Provides the means to indicate the security status of child zones and (if the child supports secure resolution services) to enable verification of a chain of trust among parent and child domains, when operating as part of a distributed, hierarchical namespace.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SC-21	SECURE NAME / ADDRESS RESOLUTION SERVICE (RECURSIVE OR CACHING RESOLVER)	The information system requests and performs data origin authentication and data integrity verification on the name/address resolution responses the system receives from authoritative sources.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SC-22	ARCHITECTURE AND PROVISIONING FOR NAME / ADDRESS RESOLUTION SERVICE	The information systems that collectively provide name/address resolution service for an organization are fault-tolerant and implement internal/external role separation.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SC-39	PROCESS ISOLATION	The information system maintains a separate execution domain for each executing process.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SC-41	PORT AND I/O DEVICE ACCESS	The organization physically disables or removes [Assignment: organization-defined connection ports or input/output devices] on [Assignment: organization-defined information systems or information system components].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SI-1	SYSTEM AND INFORMATION INTEGRITY POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A system and information integrity policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the system and information integrity policy and associated system and information integrity controls; and b. Reviews and updates the current: 1. System and information integrity policy [Assignment: organization-defined frequency]; and 2. System and information integrity procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SI-2	FLAW REMEDIATION	The organization: a. Identifies, reports, and corrects information system flaws; b. Tests software and firmware updates related to flaw remediation for effectiveness and potential side effects before installation; c. Installs security-relevant software and firmware updates within [Assignment: organization-defined time period] of the release of the updates; and d. Incorporates flaw remediation into the organizational configuration management process.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SI-3	MALICIOUS CODE PROTECTION	The organization: a. Employs malicious code protection mechanisms at information system entry and exit points to detect and eradicate malicious code; b. Updates malicious code protection mechanisms whenever new releases are available in accordance with organizational configuration management policy and procedures; c. Configures malicious code protection mechanisms to: 1. Perform periodic scans of the information system [Assignment: organization-defined frequency] and real-time scans of files from external sources at [Selection (one or more); endpoint; network entry/exit points] as the files are downloaded, opened, or executed in accordance with organizational security policy; and 2. [Selection (one or more): block malicious code; quarantine malicious code; send alert to administrator; [Assignment: organization-defined action]] in response to malicious code detection; and d. Addresses the receipt of false positives during malicious code detection and eradication and the resulting potential impact on the availability of the information system.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SI-4	INFORMATION SYSTEM MONITORING	The organization: a. Monitors the information system to detect: 1. Attacks and indicators of potential attacks in accordance with [Assignment: organization-defined monitoring objectives]; and 2. Unauthorized local, network, and remote connections; b. Identifies unauthorized use of the information system through [Assignment: organization-defined techniques and methods]; c. Deploys monitoring devices: (i) strategically within the information system to collect organization-determined essential information; and (ii) at ad hoc locations within the system to track specific types of transactions of interest to the organization; d. Protects information obtained from intrusion-monitoring tools from unauthorized access, modification, and deletion; e. Heightens the level of information system monitoring activity whenever there is an indication of increased risk to organizational operations and assets, individuals, other organizations, or the Nation based on law enforcement information, intelligence information, or other credible sources of information; f. Obtains legal opinion with regard to information system monitoring activities in accordance with applicable federal laws, Executive Orders, directives, policies, or regulations; and g. Provides [Assignment: organization-defined information system monitoring information] to [Assignment: organization-defined personnel or roles] [Selection (one or more): as needed; [Assignment: organization-defined frequency]].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
SI-5	SECURITY ALERTS, ADVISORIES, AND DIRECTIVES	The organization: a. Receives information system security alerts, advisories, and directives from [Assignment: organization-defined external organizations] on an ongoing basis; b. Generates internal security alerts, advisories, and directives as deemed necessary; c. Disseminates security alerts, advisories, and directives to: [Selection (one or more): [Assignment: organization-defined personnel (identified by name and/or by role)]; [Assignment: organization-defined elements within the organization]; [Assignment: organization-defined external organizations]]; and d. Implements security directives in accordance with established time frames, or notifies the issuing organization of the degree of noncompliance.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SI-12	INFORMATION HANDLING AND RETENTION	The organization handles and retains information within the information system and information output from the system in accordance with applicable federal laws, Executive Orders, directives, policies, regulations, standards, and operational requirements.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SI-17	FAIL-SAFE PROCEDURES	The information system implements [Assignment: organization-defined fail-safe procedures] when [Assignment: organization-defined failure conditions occur].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PM-1	INFORMATION SECURITY PROGRAM PLAN	The organization: a. Develops and disseminates an organization-wide information security program plan that: 1. Provides an overview of the requirements for the security program and a description of the security program management controls and common controls in place or planned for meeting those requirements; 2. Includes the identification and assignment of roles, responsibilities, management commitment, coordination among organizational entities, and compliance; 3. Reflects coordination among organizational entities responsible for the different aspects of information security (i.e., technical, physical, personnel, cyber-physical); and 4. Is approved by a senior official with responsibility and accountability for the risk being incurred to organizational operations (including mission, functions, image, and reputation), organizational assets, individuals, other organizations, and the Nation; b. Reviews the organization-wide information security program plan [Assignment: organization-defined frequency]; c. Updates the plan to address organizational changes and problems identified during plan implementation or security control assessments; and d. Protects the information security program plan from unauthorized disclosure and modification.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PM-2	SENIOR INFORMATION SECURITY OFFICER	The organization appoints a senior information security officer with the mission and resources to coordinate, develop, implement, and maintain an organization-wide information security program.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PM-3	INFORMATION SECURITY RESOURCES	The organization: a. Ensures that all capital planning and investment requests include the resources needed to implement the information security program and documents all exceptions to this requirement; b. Employs a business case/Exhibit 300/Exhibit 53 to record the resources required; and c. Ensures that information security resources are available for expenditure as planned.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PM-4	PLAN OF ACTION AND MILESTONES PROCESS	The organization: a. Implements a process for ensuring that plans of action and milestones for the security program and associated organizational information systems: 1. Are developed and maintained; 2. Document the remedial information security actions to adequately respond to risk to organizational operations and assets, individuals, other organizations, and the Nation; and 3. Are reported in accordance with OMB FISMA reporting requirements. b. Reviews plans of action and milestones for consistency with the organizational risk management strategy and organization-wide priorities for risk response actions.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PM-5	INFORMATION SYSTEM INVENTORY	The organization develops and maintains an inventory of its information systems.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PM-6	INFORMATION SECURITY MEASURES OF PERFORMANCE	The organization develops, monitors, and reports on the results of information security measures of performance.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PM-7	ENTERPRISE ARCHITECTURE	The organization develops an enterprise architecture with consideration for information security and the resulting risk to organizational operations, organizational assets, individuals, other organizations, and the Nation.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PM-8	CRITICAL INFRASTRUCTURE PLAN	The organization addresses information security issues in the development, documentation, and updating of a critical infrastructure and key resources protection plan.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PM-9	RISK MANAGEMENT STRATEGY	The organization: a. Develops a comprehensive strategy to manage risk to organizational operations and assets, individuals, other organizations, and the Nation associated with the operation and use of information systems; b. Implements the risk management strategy consistently across the organization; and c. Reviews and updates the risk management strategy [Assignment: organization-defined frequency] or as required, to address organizational changes.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PM-10	SECURITY AUTHORIZATION PROCESS	The organization: a. Manages (i.e., documents, tracks, and reports) the security state of organizational information systems and the environments in which those systems operate through security authorization processes; b. Designates individuals to fulfill specific roles and responsibilities within the organizational risk management process; and c. Fully integrates the security authorization processes into an organization-wide risk management program.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PM-11	MISSION/BUSINESS PROCESS DEFINITION	The organization: a. Defines mission/business processes with consideration for information security and the resulting risk to organizational operations, organizational assets, individuals, other organizations, and the Nation; and b. Determines information protection needs arising from the defined mission/business processes and revises the processes as necessary, until achievable protection needs are obtained.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
PM-12	INSIDER THREAT PROGRAM	The organization implements an insider threat program that includes a cross-discipline insider threat incident handling team.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PM-13	INFORMATION SECURITY WORKFORCE	The organization establishes an information security workforce development and improvement program.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PM-14	TESTING, TRAINING, AND MONITORING	The organization: a. Implements a process for ensuring that organizational plans for conducting security testing, training, and monitoring activities associated with organizational information systems: 1. Are developed and maintained; and 2. Continue to be executed in a timely manner; b. Reviews testing, training, and monitoring plans for consistency with the organizational risk management strategy and organization-wide priorities for risk response actions.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PM-15	CONTACTS WITH SECURITY GROUPS AND ASSOCIATIONS	The organization establishes and institutionalizes contact with selected groups and associations within the security community: a. To facilitate ongoing security education and training for organizational personnel; b. To maintain currency with recommended security practices, techniques, and technologies; and c. To share current security-related information including threats, vulnerabilities, and incidents.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PM-16	THREAT AWARENESS PROGRAM	The organization implements a threat awareness program that includes a cross-organization information-sharing capability.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.

Control Correlation Identifiers (CCI) List

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-000043	AC-7(a)	The organization defines the maximum number of consecutive invalid logon attempts to the information system by a user during an organization-defined time period.	DoD-Defined Designer Impractical	Unsuccessful Logon Attempts	Except for high availability user interfaces indicated as exempt, devices must meet the indicated requirements (3) for handling unsuccessful logon attempts. If a device cannot meet these requirements, document device capabilities to protect from subsequent logon attempts and propose alternate protections in a Device Account Lock Exception Request submittal. Do not implement alternate protection measures in lieu of the indicated requirements without explicit permission from the Government.
CCI-000044	AC-7(a)	The information system enforces the organization-defined limit of consecutive invalid logon attempts by a user during the organization-defined time period.	Designer	Unsuccessful Logon Attempts	Except for high availability user interfaces indicated as exempt, devices must meet the indicated requirements (3) for handling unsuccessful logon attempts. If a device cannot meet these requirements, document device capabilities to protect from subsequent logon attempts and propose alternate protections in a Device Account Lock Exception Request submittal. Do not implement alternate protection measures in lieu of the indicated requirements without explicit permission from the Government.
CCI-000048	AC-8(a)	The information system displays an organization-defined system use notification message or banner before granting access to the system that provides privacy and security notices consistent with applicable federal laws, Executive Orders, directives, policies, regulations, standards, and guidance.	Enclave Designer Impractical	System Use Notification	For networked devices with Remote User Interfaces which are capable, Contractor is required to configure the device to display a warning banner meeting the requirements of DTM 08-060 on screen. For Devices which are connected to a network and have a local user interface Contractor must ensure these display a warning banner meeting the requirements of DTM 08-060 on the user interface screen if capable of doing so and must have a permanently affixed label with an approved banner from DTM 08-060 if unable to display the warning banner on the screen. Where it is impractical (perhaps due to device size) to affix the label to the device, affix the label to the device enclosure.Labels must be machine printed or engraved, plastic or metal, designed for permanent installation, must use a font no smaller than 14 point, and must provide a high contrast between font and background colors.
CCI-000050	AC-8(b)	The information system retains the notification message or banner on the screen until users acknowledge the usage conditions and take explicit actions to log on to or further access.	Enclave Designer	System Use Notification	See CCI-000048
CCI-000061	AC-14(a)	The organization identifies and defines organization-defined user actions that can be performed on the information system without identification or authentication consistent with organizational missions/business functions.	Designer	Permitted Actions Without Identification and Authentication	---
CCI-000123	AU-2(a)	The organization determines the information system must be capable of auditing an organization-defined list of auditable events.	Designer Non-Designer	Audit Events, Content of Audit Records, and Audit Generation	This is met by requiring the contractor to configure all BAS Controllers which FULLY Support Accounts to audit: a. Successful and unsuccessful logon attempts to the controller; b. Successful logouts; c. All account creations, modifications, disabling, and terminations; d. All controller shutdown and startup. For all other controllers, there are no requirements to perform auditing at these field controllers that do not FULLY support accounts and are not capable of meeting these requirements.
CCI-000125	AU-2(c)	The organization provides a rationale for why the list of auditable events is deemed to be adequate to support after-the-fact investigations of security incidents.	Designer Non-Designer	Audit Events, Content of Audit Records, and Audit Generation	This is met by requiring the contractor to configure all BAS Controllers which FULLY Support Accounts to audit what type of event occurred, when the event occurred, where the event occurred, the source of the event, the outcome of the event, the identity of any individuals or subjects associated with the event, as applicable and as the controller is capable.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-000130	AU-3	The information system generates audit records containing information that establishes what type of event occurred.	Designer	Audit Events, Content of Audit Records, and Audit Generation	For those controllers capable of performing auditing, this is met by requiring the contractor to configure the controller to generate audit records containing information that establishes what type of event occurred. Contractor to determine and apply all STIGs/SRGs.
CCI-000131	AU-3	The information system generates audit records containing information that establishes when an event occurred.	Designer	Audit Events, Content of Audit Records, and Audit Generation	For those controllers capable of performing auditing, this is met by requiring the contractor to configure the controller to g audit records containing information that establishes when an event occurred. Contractor to determine and apply all STIGs/SRGs.
CCI-000132	AU-3	The information system generates audit records containing information that establishes where the event occurred.	Designer	Audit Events, Content of Audit Records, and Audit Generation	For those controllers capable of performing auditing, this is met by requiring the contractor to configure the controller to generate audit records containing information that establishes where the event occurred. Contractor to determine and apply all STIGs/SRGs.
CCI-000133	AU-3	The information system generates audit records containing information that establishes the source of the event.	Designer	Audit Events, Content of Audit Records, and Audit Generation	For those controllers capable of performing auditing, this is met by requiring the contractor to configure the controller to generate audit records containing information that establishes the source of the event. Contractor to determine and apply all STIGs/SRGs.
CCI-000134	AU-3	The information system generates audit records containing information that establishes the outcome of the event.	Designer	Audit Events, Content of Audit Records, and Audit Generation	For those controllers capable of performing auditing, this is met by requiring the contractor to configure the controller to generate audit records containing information that establishes the outcome of the event. Contractor to determine and apply all STIGs/SRGs.
CCI-000159	AU-8(a)	The information system uses internal system clocks to generate time stamps for audit records.	Designer	Audit Time Stamps	This is partially met by requiring the contractor to ensure that any device, (controller) generating audit records must have an internal clock capable of providing time with a resolution of one second. Contractor to ensure clocks must not drift more than 10 seconds per day. Contractor must configure the system so that each device (computer or controller) generating audit records maintains accurate time to within one second. Contractor is to ensure that if the control system specifications include requirement for clocks, the most stringent requirement applies. Contractor is responsible to determine and apply all applicable STIGs and SRGs. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06).
CCI-000169	AU-12(a)	The information system provides audit record generation capability for the auditable events defined in AU-2 a at organization defined information system components.	Designer	Audit Events, Content of Audit Records, and Audit Generation	The contractor is responsible for configuring the control system device(s) to provide audit record generation capability for the auditable events defined in AU-2(a) at organization defined control system components.
CCI-000171	AU-12(b)	The information system allows organization-defined personnel or roles to select which auditable events are to be audited by specific components of the information system.	Designer Impractical	Audit Events, Content of Audit Records, and Audit Generation	This is partially met by requiring the contractor to ensure that controllers will be configured to record, Successful and unsuccessful logon attempts to the controller; Successful logouts; All account creations, modifications, disabling, and terminations; All controller shutdown and startup. Contractor is required to provide step-by-step documentation for this process as a part of the control systems final CYBERSECURITY DOCUMENTATION submittal. If the controller does not support this capability, the Contractor is to provide a statement documenting this deficiency as a part of the final Control System Cybersecurity Documentation. Contractor is required to determine and apply all applicable STIGs/SRGs.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-000172	AU-12(c)	The information system generates audit records for the events defined in AU-2 d with the content defined in AU-3.	Designer	Audit Events, Content of Audit Records, and Audit Generation	This is partially met by requiring the contractor to configure ontrollers to generate audit records for the defined subset of the auditable events defined in AU-2, CCI-000126, which are listed the events listed in AU-2 (a), CCI-000123 per occurrence as required by DoD, which will contain information that establishes the outcome of the event as defined by AU-3, CCI-000134. Contractor is required to determine and apply all applicable STIGs/SRGs applicable STIGs or SRGs that pertains to CCI-000172. For controllers with the capability to store audit records, contractor to configure the generating and storing audit records locally in its internal memory for these records to be retrieved and reviewed during routine maintenance or inspection by the ISSM or individual appointed by the ISSM upon final acceptance of the control system. Contractor to provide step-by-step documentation for this process as a part of the control systems final CYBERSECURITY DOCUMENTATION submittal.
CCI-000176	IA-5(b)	The organization manages information system authenticators by establishing initial authenticator content for authenticators defined by the organization.	Designer Non-Designer	---	The organization is responsible for managing control system authenticators by establishing initial authenticator content for authenticators defined by the organization.
CCI-000182	IA-5(g)	The organization manages information system authenticators by changing/refreshing authenticators in accordance with the organization defined time period by authenticator type.	DoD-Defined Designer Non-Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	All other devices and software must not use cached authenticators. For all non-computing components, (e.g., PLC's, RTU's, and Human Machine Interface (HMI)'s) that cannot meet the password requirements, contractor is required to use the strongest password that is technically feasible as long as this does not interfere with the full functionality of the control system component and the control system it supports, as designed.
CCI-000192	IA-5(1)(a)	The information system enforces password complexity by the minimum number of upper case characters used.	Enclave Designer	USER IDENTIFICATION AND AUTHENTICATION	This is partially met by requiring the contractor to configure any any devices (controllers) FULLY supporting accounts and supporting password-based authentication, and Passwords for Remote Interfaces to contain at least one uppercase character. Contractor is required to determine and apply all applicable STIGs/SRGs. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06)
CCI-000193	IA-5(1)(a)	The information system enforces password complexity by the minimum number of lower case characters used.	Enclave Designer	USER IDENTIFICATION AND AUTHENTICATION	This is partially met by requiring the contractor to configure any any devices (controllers) FULLY supporting accounts and supporting password-based authentication, and Passwords for Remote Interfaces to contain at least one lowercase character. Contractor is required to determine and apply all applicable STIGs/SRGs. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06)

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-000194	IA-5(1)(a)	The information system enforces password complexity by the minimum number of numeric characters used.	Enclave Designer	USER IDENTIFICATION AND AUTHENTICATION	This is partially met by requiring the contractor to configure any any devices (controllers) FULLY supporting accounts and supporting password-based authentication, and Passwords for Remote Interfaces to contain at least one numeric character. Contractor is required to determine and apply all applicable STIGs/SRGs. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06)
CCI-000195	IA-5(1)(b)	The information system, for password-based authentication, when new passwords are created, enforces that at least an organization-defined number of characters are changed.	Enclave Designer	USER IDENTIFICATION AND AUTHENTICATION	This is partially met by requiring the contractor to configure any any devices (controllers) FULLY supporting accounts and supporting password-based authentication, and Passwords for Remote Interfaces to ensure all password must differ from previous five passwords, where differ is defined as changing at least 50 percent of the characters. Contractor is required to determine and apply all applicable STIGs/SRGs. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06)
CCI-000196	IA-5(1)(c)	The information system, for password-based authentication, stores only cryptographically-protected passwords.	Enclave Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	This is partially met by requiring the contractor to configure any any devices (computer or controllers) FULLY supporting accounts and supporting password-based authentication, and Passwords for Remote Interfaces to ensure must be cryptographically protected during storage and transmission. Contractor is required to determine and apply all applicable STIGs/SRGs. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06)
CCI-000197	IA-5(1)(c)	The information system, for password-based authentication, transmits only cryptographically-protected passwords.	Enclave Designer	USER IDENTIFICATION AND AUTHENTICATION	This is partially met by requiring the contractor to configure any any devices (computer or controllers) FULLY supporting accounts and supporting password-based authentication, and Passwords for Remote Interfaces to ensure must be cryptographically protected during storage and transmission. Contractor is required to determine and apply all applicable STIGs/SRGs. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06)
CCI-000198	IA-5(1)(d)	The information system enforces minimum password lifetime restrictions.	Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	Not applicable at the controller; This is managed at PIT L2 computer or above which allows for minimum lifetime of 24 hours which allows the use of a temporary password for system logons with an immediate change to a permanent password.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-000199	IA-5(1)(d)	The information system enforces maximum password lifetime restrictions.	Enclave Designer	USER IDENTIFICATION AND AUTHENTICATION	This is partially met by requiring the contractor to configure all controllers FULLY supporting user accounts, to ensure that passwords must have a maximum lifetime of 60 days. Contractor to configure the computer or controller to prompt users to change passwords. Contractor to ensure accounts do not lock due to expired passwords.Contractor is required to determine and apply all applicable STIGs/SRGs. Contractor is required to determine and apply all applicable STIGs/SRGs. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06)
CCI-000200	IA-5(1)(e)	The information system prohibits password reuse for the organization defined number of generations.	Enclave Designer Non-Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	This is partially met by requiring the contractor to configure all controllers FULLY supporting user accounts, to ensure that passwords must differ from previous five passwords, where differ is defined as changing 50 percent of the characters. Contractor to configure the computer or controller to prompt users to change passwords. Contractor to ensure accounts do not lock due to expired passwords.Contractor is required to determine and apply all applicable STIGs/SRGs. Contractor is required to determine and apply all applicable STIGs/SRGs. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06)
CCI-000205	IA-5(1)(a)	The information system enforces minimum password length.	Enclave Designer	USER IDENTIFICATION AND AUTHENTICATION	Unless otherwise indicated, all user interfaces supporting accounts (either FULLY or MINIMALLY) must implement Identification and Authorization via passwords. For all non-computing components, (e.g., PLC's, RTU's, and Human Machine Interface (HMI)'s) that cannot meet the password requirements, use the strongest password that is technically feasible as long as this does not interfere with the full functionality of the control system component and the control system it supports, as designed. All devices and software must not use cached authenticators.The organization is responsible to ensure all policies and user training including advising users not to use the same password for domains of differing classification levels.
CCI-000206	IA-6	The information system obscures feedback of authentication information during the authentication process to protect the information from possible exploitation/use by unauthorized individuals.	Enclave Designer Impractical	Authenticator Feedback	This is addressed by requiring the contractor to employ devices that do not show authentication information on a display. Devices that momentarily display a character as it is entered are acceptable. For devices that have STIGs or SRGs related to CCI-000206 will comply with those requirements.
CCI-000207	PM-5	The organization develops and maintains an inventory of its information systems.	Designer Non-Designer Impractical	---	This is met requiring the contractor to complete a Control System Inventory Report using the most current Inventory Spreadsheet listed at the www.wbdg.org documenting all devices, including networked devices, network infrastructure devices, non-networked devices, input devices (e.g. sensors) and output devices (e.g. actuators) that includes all components withing the authorization boundary of the system. Contractor is required that for each device, they must provide all applicable information for which there is a field on the spreadsheet in accordance with the instructions on the spreadsheet.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-000232	AC-14(b)	The organization documents and provides supporting rationale in the security plan for the information system, user actions not requiring identification and authentication.	Designer	Permitted Actions Without Identification and Authentication	See CCI-000061
CCI-000236	PM-11(b)	The organization determines information protection needs arising from the defined mission/business processes and revises the processes as necessary, until an achievable set of protection needs are obtained.	Enclave Designer Non-Designer	---	This is partially met by implementation of the Cybersecurity Design Process as required by UFC 4-010-06. The organization is responsible to determine any information protection needs arising from the defined mission/business processes and partner with the Cybersecurity Designer to revise the processes as necessary, until an achievable set of protection needs are obtained Designer during the Five Steps for Cybersecurity Design as per Section 3-1.1, and then revised during this processes as necessary for the identified Control System(s). The contractor will then will be required to provide baseline Control System Cybersecurity Documentation at project end for all Control System, subsystems, and devices. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06).
CCI-000258	CA-3(b)	The organization documents, for each interconnection, the interface characteristics.	Enclave Designer Non-Designer	Cybersecurity Interconnection Schedule CYBERSECURITY DURING CONSTRUCTION	This is met by requiring the contractor to meet CYBERSECURITY DURING CONSTRUCTION requirements as listed in this section of the UFGS 25 05 11.XX. The Contractor is also required to provide a completed Cybersecurity Interconnection Schedule documenting network connections between the installed system and other systems including information for each device directly communicating between systems: Device Identifier, Device Description, Transport layer Protocol, Network Address, Port (if applicable), MAC (Layer 2) address (if applicable), Media, Application Protocol, Service (if applicable), Descriptive Purpose of communication. The organization is responsible to document any Interconnection security agreements which are required for systems connecting between enclaves which can include both DoD enclaves or non DoD enclaves.The contractor is responsible for ensuring that all Ethernet switches are provided and configured as listed in the UFGS Section ETHERNET SWITCH. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06).
CCI-000293	CM-2	The organization develops and documents a current baseline configuration of the information system.	Designer	---	This is met by requiring the Contractor to provide all baseline Control System Cybersecurity Documentation at project end for all Control System, subsystems, and devices. The Government organization is responsble to continue to develop and document current baseline configuration of the control system, subsystem and devices throughout the lifecycle of the control system.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-000363	CM-6(a)	The organization defines security configuration checklists to be used to establish and document configuration settings for the information system technology products employed.	Designer	REQUIREMENTS FOR LEAST FUNCTIONALITY	This is met by requiring the Contractor to ensure that IP Networks must be Ethernet networks and must use switches as defined in this Section. Contractor must not use nonsecure functions, ports, protocols and services as defined in DODI 8551.01 unless those ports, protocols and services are specifically required by the control system specifications or otherwise specifically authorized by the Government. Contractor must not use, and/or must physically disable or remove ports, protocols and services that are not specified in the control system specifications or required for operation of the control system. For devices that have a STIG or SRG related to Requirements for Least Functionality (such as configuration settings and port and device I/O access for least functionality), Contractor is required to install and configure the device in accordance with that STIG or SRGs.
CCI-000364	CM-6(a)	The organization establishes configuration settings for information technology products employed within the information system using organization-defined security configuration checklists.	Designer	REQUIREMENTS FOR LEAST FUNCTIONALITY	This is met by requiring the Contractor to ensure that IP Networks must be Ethernet networks and must use switches as defined in this Section. Contractor must not use nonsecure functions, ports, protocols and services as defined in DODI 8551.01 unless those ports, protocols and services are specifically required by the control system specifications or otherwise specifically authorized by the Government. Contractor must not use, and/or must physically disable or remove ports, protocols and services that are not specified in the control system specifications or required for operation of the control system. For devices that have a STIG or SRG related to Requirements for Least Functionality (such as configuration settings and port and device I/O access for least functionality), Contractor is required to install and configure the device in accordance with that STIG or SRGs.
CCI-000365	CM-6(a)	The organization documents configuration settings for information technology products employed within the information system using organization-defined security configuration checklists that reflect the most restrictive mode consistent with operational requirements.	DoD-Defined Designer Non-Designer Impractical	REQUIREMENTS FOR LEAST FUNCTIONALITY	This is met by requiring the Contractor to ensure that IP Networks must be Ethernet networks and must use switches which are Ethernet Switches as defined in this Section. Contractor must not use nonsecure functions, ports, protocols and services as defined in DODI 8551.01 unless those ports, protocols and services are specifically required by the control system specifications or otherwise specifically authorized by the Government. Contractor must not use, and/or must physically disable or remove ports, protocols and services that are not specified in the control system specifications or required for operation of the control system. For devices that have a STIG or SRG related to Requirements for Least Functionality (such as configuration settings and port and device I/O access for least functionality), Contractor is required to install and configure the device in accordance with that STIG or SRGs.
CCI-000380	CM-7(b)	The organization defines for the information system prohibited or restricted functions, ports, protocols, and/or services.	Designer	IP Control Networks REQUIREMENTS FOR LEAST FUNCTIONALITY	The organization is responsible for defining the prohibited or restricted functions, ports, protocols, and/or services for the control system. DoD has defined the control system prohibited or restricted functions, ports, protocols, and/or services as IAW DoDI 8551.01.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-000381	CM-7(a)	The organization configures the information system to provide only essential capabilities.	Designer	IP Control Networks REQUIREMENTS FOR LEAST FUNCTIONALITY	This is met by requiring the Contractor to ensure that IP Networks must be Ethernet networks and must use switches which are Ethernet Switches as defined in this Section. Contractor must not use nonsecure functions, ports, protocols and services as defined in DODI 8551.01 unless those ports, protocols and services are specifically required by the control system specifications or otherwise specifically authorized by the Government. Contractor must not use, and/or must physically disable or remove ports, protocols and services that are not specified in the control system specifications or required for operation of the control system. For devices that have a STIG or SRG related to Requirements for Least Functionality (such as configuration settings and port and device I/O access for least functionality), Contractor is required to install and configure the device in accordance with that STIG or SRGs.
CCI-000382	CM-7(b)	The organization configures the information system to prohibit or restrict the use of organization-defined functions, ports, protocols, and/or services.	Designer	IP Control Networks REQUIREMENTS FOR LEAST FUNCTIONALITY	This is met by requiring the Contractor to ensure that IP Networks must be Ethernet networks and must use switches which are Ethernet Switches as defined in this Section. Contractor must not use nonsecure functions, ports, protocols and services as defined in DODI 8551.01 unless those ports, protocols and services are specifically required by the control system specifications or otherwise specifically authorized by the Government. Contractor must not use, and/or must physically disable or remove ports, protocols and services that are not specified in the control system specifications or required for operation of the control system. For devices that have a STIG or SRG related to Requirements for Least Functionality (such as configuration settings and port and device I/O access for least functionality), Contractor is required to install and configure the device in accordance with that STIG or SRGs.
CCI-000389	CM-8(a)(1)	The organization develops and documents an inventory of information system components that accurately reflects the current information system.	Designer	Control System Inventory Report	This is met requiring the contractor to complete a Control System Inventory Report using the most current Inventory Spreadsheet listed at the www.wbdg.org documenting all devices, including networked devices, network infrastructure devices, non-networked devices, input devices (e.g. sensors) and output devices (e.g. actuators). Contractor is required that for each device, they must provide all applicable information for which there is a field on the spreadsheet in accordance with the instructions on the spreadsheet.
CCI-000392	CM-8(a)(2)	The organization develops and documents an inventory of information system components that includes all components within the authorization boundary of the information system.	Designer	Control System Inventory Report	This is met requiring the contractor to complete a Control System Inventory Report using the most current Inventory Spreadsheet listed at the www.wbdg.org documenting all devices, including networked devices, network infrastructure devices, non-networked devices, input devices (e.g. sensors) and output devices (e.g. actuators) that includes all components withing the authorization boundary of the system. Contractor is required that for each device, they must provide all applicable information for which there is a field on the spreadsheet in accordance with the instructions on the spreadsheet.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-000398	CM-8(a)(4)	The organization defines information deemed necessary to achieve effective information system component accountability.	DoD-Defined Designer Non-Designer Impractical	Control System Inventory Report	This is met requiring the contractor to complete a Control System Inventory Report using the most current Inventory Spreadsheet listed at the www.wbdg.org documenting all devices, including networked devices, network infrastructure devices, non-networked devices, input devices (e.g. sensors) and output devices (e.g. actuators). Contractor is required that for each device, they must provide all applicable information for which there is a field on the spreadsheet in accordance with the instructions on the spreadsheet.
CCI-000764	IA-2	The information system uniquely identifies and authenticates organizational users (or processes acting on behalf of organizational users).	Enclave Designer Impractical	User Accounts USER IDENTIFICATION AND AUTHENTICATION	Impractical; the controllers do not support connectivity to a central validation system. The controllers do not support the use of PIV authentication.
CCI-000765	IA-2(1)	The information system implements multifactor authentication for network access to privileged accounts.	Enclave Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	Impractical; the controllers do not support connectivity to a central validation system. The controllers do not support the use of PIV authentication.
CCI-000777	IA-3	The organization defines a list of specific and/or types of devices for which identification and authentication is required before establishing a connection to the information system.	DoD-Defined Enclave Designer Impractical	Control System Inventory Report Device Identification and Authentication	This is partially met by requiring the contractor to provide a Control System Inventory Report using the most current Inventory Spreadsheet listed at the www.wbdg.org documenting all devices, including networked devices, network infrastructure devices, non-networked devices, input devices (e.g. sensors) and output devices (e.g. actuators). For each device contractor to provide all applicable information for which there is a field on the spreadsheet in accordance with the instructions on the spreadsheet. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06).
CCI-000778	IA-3	The information system uniquely identifies an organization defined list of specific and/or types of devices before establishing a local, remote, or network connection.	Enclave Designer Impractical	Control System Inventory Report Device Identification and Authentication	This is partially met by requiring the contractor to provide a Control System Inventory Report using the most current Inventory Spreadsheet listed at the www.wbdg.org documenting all devices, including networked devices, network infrastructure devices, non-networked devices, input devices (e.g. sensors) and output devices (e.g. actuators). For each device contractor to provide all applicable information for which there is a field on the spreadsheet in accordance with the instructions on the spreadsheet. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06).
CCI-000803	IA-7	The information system implements mechanisms for authentication to a cryptographic module that meet the requirements of applicable federal laws, Executive Orders, directives, policies, regulations, standards, and guidance for such authentication.	Enclave Designer Impractical	Cryptographic Module Authentication	Impractical; Controllers and related equipment do not support authentication to a crypotgraphic module.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-001048	RA-3(a)	The organization conducts an assessment of risk of the information system and the information it processes, stores, or transmits that includes the likelihood and magnitude of harm from the unauthorized access, use, disclosure, disruption, modification, or destruction.	Designer Non-Designer	---	This is met by implementation of the Cybersecurity Design Process as required by UFC 4-010-06. The organization is responsible to conduct a risk of the system and the information it processes, stores, or transmits that includes the likelihood and magnitude of harm from the unauthorized access, use, disclosure, disruption, modification, or destruction which is then documented by the Designer as per Section 3-1.1 Five Steps for Cybersecurity Design. This risk is revised during this processes as necessary. The Design process concludes with the provision of the appropriate 25 05 11.XX UFGS Specification for the identified Control System(s) iwhich the Contractor will be required to provide baseline Control System Cybersecurity Documentation at project end for all Control System, subsystems, and devices.
CCI-001054	RA-5(a)	The organization scans for vulnerabilities in the information system and hosted applications on an organization-defined frequency.	Enclave Designer Non-Designer	VULNERABILITY SCANNING	This is partially met by requiring the contractor to ensure that all IP devices must be scannable, such that the device can be scanned by industry standard IP network scanning utilities without harm to the device, application, or functionality. For controllers, contractor must provide controllers that are scannable by standard control system discovery tools or control system browsers and return meaningful status information including the network inputs and outputs for the controller.This information must contain sufficient detail to detect vulnerabilities or exploits of the controller. Contractor must provide all software needed to scan the control system as the Control System Scanning Tools submittal. If the software required to scan the system is already installed at the project site or is provided under a separate section instead contractor must provide a statement indicating this. The organization is responsible to scan for vulnerabilities in the system and hosted applications according to the DoD defined frequency of every 30 days or as directed by an authoritative source (e.g. IAVM, CTOs, DTMs, STIGs) upon final acceptance of the system.
CCI-001055	RA-5(a)	The organization defines a frequency for scanning for vulnerabilities in the information system and hosted applications.	DoD-Defined Enclave Designer Impractical	VULNERABILITY SCANNING	This is partially met by requiring the contractor to ensure that all IP devices must be scannable, such that the device can be scanned by industry standard IP network scanning utilities without harm to the device, application, or functionality. For controllers, contractor must provide controllers that are scannable by standard control system discovery tools or control system browsers and return meaningful status information including the network inputs and outputs for the controller.This information must contain sufficient detail to detect vulnerabilities or exploits of the controller. Contractor must provide all software needed to scan the control system as the Control System Scanning Tools submittal. If the software required to scan the system is already installed at the project site or is provided under a separate section instead contractor must provide a statement indicating this. The organization is responsible to scan for vulnerabilities in the system and hosted

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-001056	RA-5(a)	The organization scans for vulnerabilities in the information system and hosted applications when new vulnerabilities potentially affecting the system/applications are identified and reported.	Enclave Designer Non-Designer	VULNERABILITY SCANNING	This is partially met by requiring the contractor to ensure that all IP devices must be scannable, such that the device can be scanned by industry standard IP network scanning utilities without harm to the device, application, or functionality. For controllers, contractor must provide controllers that are scannable by standard control system discovery tools or control system browsers and return meaningful status information including the network inputs and outputs for the controller.This information must contain sufficient detail to detect vulnerabilities or exploits of the controller. Contractor must provide all software needed to scan the control system as the Control System Scanning Tools submittal. If the software required to scan the system is already installed at the project site or is provided under a separate section instead contractor must provide a statement indicating this. The organization is responsible to conduct vulnerability scans of the system and hosted applications when new vulnerabilities potentially affecting the system/applications are identified and reported via authoritative sources (e.g., IAVM, CTO, DTM, STIG, product vendor), upon final acceptance of the system.
CCI-001057	RA-5(b)	The organization employs vulnerability scanning tools and techniques that facilitate interoperability among tools and automate parts of the vulnerability management process by using standards for: enumerating platforms, software flaws, and improper configurations; formatting checklists and test procedures; and measuring vulnerability impact.	Enclave Designer Non-Designer Impractical	VULNERABILITY SCANNING	This is partially met by requiring the contractor to ensure that all IP devices must be scannable, such that the device can be scanned by industry standard IP network scanning utilities without harm to the device, application, or functionality. For controllers, contractor must provide controllers that are scannable by standard control system discovery tools or control system browsers and return meaningful status information including the network inputs and outputs for the controller.This information must contain sufficient detail to detect vulnerabilities or exploits of the controller. Contractor must provide all software needed to scan the control system as the Control System Scanning Tools submittal. If the software required to scan the system is already installed at the project site or is provided under a separate section instead contractor must provide a statement indicating this. The organization is responsible to employ the DoD Enterprise scanning tool to scan for vulnerabilities in the system and hosted applications according to the DoD defined frequency of every 30 days or as directed by an authoritative source (e.g. IAVM, CTOs, DTMs, STIGs) upon final acceptance of the system.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-001058	RA-5(c)	The organization analyzes vulnerability scan reports and results from security control assessments.	Enclave Designer Non-Designer	VULNERABILITY SCANNING	This is partially met by requiring the contractor to ensure that all IP devices must be scannable, such that the device can be scanned by industry standard IP network scanning utilities without harm to the device, application, or functionality. For controllers, contractor must provide controllers that are scannable by standard control system discovery tools or control system browsers and return meaningful status information including the network inputs and outputs for the controller.This information must contain sufficient detail to detect vulnerabilities or exploits of the controller. Contractor must provide all software needed to scan the control system as the Control System Scanning Tools submittal. If the software required to scan the system is already installed at the project site or is provided under a separate section instead contractor must provide a statement indicating this. The organization is responsible to analyze vulnerability scan reports and security control assessment results with the intent of identifying legitimate vulnerabilities and the relationship between vulnerabilities and security controls in the system and hosted applications according to the DoD defined frequency of every 30 days or as directed by an authoritative source (e.g. IAVM, CTOs, DTMs, STIGs) upon final
CCI-001059	RA-5(d)	The organization remediates legitimate vulnerabilities in organization-defined response times in accordance with an organizational assessment risk.	Enclave Designer Non-Designer Impractical	VULNERABILITY SCANNING	This is partially met by requiring the contractor to ensure that all IP devices must be scannable, such that the device can be scanned by industry standard IP network scanning utilities without harm to the device, application, or functionality. For controllers, contractor must provide controllers that are scannable by standard control system discovery tools or control system browsers and return meaningful status information including the network inputs and outputs for the controller.This information must contain sufficient detail to detect vulnerabilities or exploits of the controller. Contractor must provide all software needed to scan the control system as the Control System Scanning Tools submittal. If the software required to scan the system is already installed at the project site or is provided under a separate section instead contractor must provide a statement indicating this. The organization is responsible to take corrective actions as appropriate on legitimate vulnerabilities identified in RA-5, CCI 001058 IAW an authoritative source (e.g. IAVM, CTOs, DTMs, STIGs) when scanning for vulnerabilities in the system and hosted applications according to the DoD defined frequency of every 30 days or as directed by an authoritative source (e.g. IAVM, CTOs, DTMs, STIGs) upon final
CCI-001097	SC-7(a)	The information system monitors and controls communications at the external boundary of the system and at key internal boundaries within the system.	DoD-Defined Enclave Designer Impractical	Physical Security Denial of Service Protection Process Isolation and Boundary Protection	Enclave; The network is monitored by the enclave. There is no local monitoring provided by the local system.
CCI-001241	SI-3(c)(1)	The organization configures malicious code protection mechanisms to perform periodic scans of the information system on an organization-defined frequency.	Enclave Designer Non-Designer	Malicious Code Protection	Impractical; only applicable at the computer level.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-001253	SI-4(a)(1)	The organization defines the objectives of monitoring for attacks and indicators of potential attacks on the information system.	DoD-Defined Enclave Designer Impractical	Information System Monitoring	This is partially met through the implementation of the Cybersecurity Design Process as required by UFC 4-010-06 with the provision of the appropriate 25 05 11 UFGS Specification for the identified Control System(s). OT systems in DoD buildings (e.g., HVAC, access control, energy management) are designed with cybersecurity measures integrated from the start, not as an afterthought through this process. The Contractor is required to to execute the government approved, Issued For Construction specification of the appropriate 25 05 11 which ensures that the developer of the system, system component, or service ensures sensor placement and monitoring requirements as per the DoD defined monitoring objectives requirements within CJCSI 6510.01F. The government organization is responsible for oversight to ensure the contractor executes the appropriate 25 05 11.XX contracts/agreements related to the control system. For all else, the Government manages and maintains the existing network and will configure network monitoring software for all new work provided under this contract. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the
CCI-001423	AC-7(a)	The organization defines the time period in which the organization-defined maximum number of consecutive invalid logon attempts occur.	DoD-Defined Designer Impractical	Unsuccessful Logon Attempts	For Devices MINIMALLY Supporting Accounts and Devices FULLY Supporting Accounts, this is met by requiring the contractor to configure the device to unlock the user account after the DoD Defined time period of 15 Minutes.
CCI-001438	AC-18(a)	The organization establishes usage restrictions for wireless access.	Designer Non-Designer	Wireless and Wired Broadcast Communication	Wireless communication is not authorized for this project.
CCI-001439	AC-18(a)	The organization establishes implementation guidance for wireless access.	Designer Non-Designer	Wireless and Wired Broadcast Communication	Wireless communication is not authorized for this project.
CCI-001441	AC-18(b)	The organization authorizes wireless access to the information system prior to allowing such connections.	Designer Non-Designer	Wireless and Wired Broadcast Communication	Wireless communication is not authorized for this project.
CCI-001459	AU-12(a)	The organization defines information system components that provide audit record generation capability.	DoD-Defined Designer Impractical	Audit Events, Content of Audit Records, and Audit Generation	The organization is responsible for defining the control system components that provide audit record generation capability.
CCI-001485	AU-2(d)	The organization defines the events which are to be audited on the information system on an organization-defined frequency of (or situation requiring) auditing for each identified event.	Designer Non-Designer	Audit Events, Content of Audit Records, and Audit Generation	For controllers capable of performing auditing, this is met by requiring the contractor to configure the devices as defined in AU-2 (a), CCI-000123. Upon final acceptance of the control system, the organization is responsible perform ongoing risk assessments of current threat information and environment or the control system, and select events accordingly as DoD has determined that the events are not appropriate to define at the Enterprise level.
CCI-001487	AU-3	The information system generates audit records containing information that establishes the identity of any individuals or subjects associated with the event.	Designer Impractical	Audit Events, Content of Audit Records, and Audit Generation	For controllers capable of performing auditing, this is met by requiring the contractor to ensure all devices be configured to generate audit records containing the information established in AU-2(a), CCI-000123, which contain information according to CCI-000130, CCI-000131, CCI-000132, CCI-000133, CCI-000134, AND CCI-001462 that establishes the identity of any individuals or subjects associated with the event. Contractor is required to determine and apply all applicable STIGs/SRGs that pertain to CCI-001487.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-001544	IA-5(c)	The organization manages information system authenticators by ensuring that authenticators have sufficient strength of mechanism for their intended use.	Designer Non-Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	This is met by the contractor ensuring that authenticators have sufficient strength of mechanism for their intended use through the required instructions as provided for CCI-000192, CCI-000193, CCI-000194, CCI-000195, CCI-000196, CCI-000197, CCI-000198, CCI-000199, CCI-000200, CCI-000205. Where these requirements conflict the contractor is instructed to apply the following order of precedence: 1) If present, Device Specific Requirements take precedence over any other requirements; and then 2) multifactor authentication requirements take precedence over password requirements.
CCI-001571	AU-2(a)	The organization defines the information system auditable events.	DoD-Defined Designer Impractical	Audit Events, Content of Audit Records, and Audit Generation	For controllers capable of performing auditing, this is met by requiring the contractor to ensure all devices be configured to generate audit records containing the information established in AU-2(a), CCI-000123, which contain information according to CCI-000130, CCI-000131, CCI-000132, CCI-000133, CCI-000134, CCI-001462, CCI-001571 that establishes the identity of any individuals or subjects associated with the event. Contractor is required to determine and apply all applicable STIGs/SRGs that pertain to CCI-001487.
CCI-001588	CM-6(a)	The organization-defined security configuration checklists reflect the most restrictive mode consistent with operational requirements.	DoD-Defined Designer Non-Designer Impractical	IP Control Networks REQUIREMENTS FOR LEAST FUNCTIONALITY	The organization is responsible for ensuring that the organization-defined security configuration checklists reflect the most restrictive mode consistent with operational requirements.
CCI-001610	IA-5(g)	The organization defines the time period (by authenticator type) for changing/refreshing authenticators.	DoD-Defined Designer Non-Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	This is met by the contractor ensuring that authenticators have sufficient strength of mechanism for their intended use through the required instructions as provided for CCI-000192, CCI-000193, CCI-000194, CCI-000195, CCI-000196, CCI-000197, CCI-000198, CCI-000199, CCI-000200, CCI-000205, CCI-001544. Where these requirements conflict the contractor is instructed to apply the following order of precedence: 1) If present, Device Specific Requirements take precedence over any other requirements; and then 2) multifactor authentication requirements take precedence over password requirements.
CCI-001611	IA-5(1)(a)	The organization defines the minimum number of special characters for password complexity enforcement.	DoD-Defined Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	This is met by the contractor ensuring that authenticators have sufficient strength of mechanism for their intended use through the required instructions as provided for CCI-000192, CCI-000193, CCI-000194, CCI-000195, CCI-000196, CCI-000197, CCI-000198, CCI-000199, CCI-000200, CCI-000205, CCI-001544, CCI-001610. Where these requirements conflict the contractor is instructed to apply the following order of precedence: 1) If present, Device Specific Requirements take precedence over any other requirements; and then 2) multifactor authentication requirements take precedence over password requirements.
CCI-001612	IA-5(1)(a)	The organization defines the minimum number of upper case characters for password complexity enforcement.	DoD-Defined Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	This is met by the contractor ensuring that authenticators have sufficient strength of mechanism for their intended use through the required instructions as provided for CCI-000192, CCI-000193, CCI-000194, CCI-000195, CCI-000196, CCI-000197, CCI-000198, CCI-000199, CCI-000200, CCI-000205, CCI-001544, CCI-001610, CCI-001611. Where these requirements conflict the contractor is instructed to apply the following order of precedence: 1) If present, Device Specific Requirements take precedence over any other requirements; and then 2) multifactor authentication requirements take precedence over password requirements.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-001613	IA-5(1)(a)	The organization defines the minimum number of lower case characters for password complexity enforcement.	DoD-Defined Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	This is met by the contractor ensuring that authenticators have sufficient strength of mechanism for their intended use through the required instructions as provided for CCI-000192, CCI-000193, CCI-000194, CCI-000195, CCI-000196, CCI-000197, CCI-000198, CCI-000199, CCI-000200, CCI-000205, CCI-001544, CCI-001610, CCI-001611, CCI-001612. Where these requirements conflict the contractor is instructed to apply the following order of precedence: 1) If present, Device Specific Requirements take precedence over any other requirements; and then 2) multifactor authentication requirements take precedence over password requirements.
CCI-001614	IA-5(1)(a)	The organization defines the minimum number of numeric characters for password complexity enforcement.	DoD-Defined Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	This is met by the contractor ensuring that authenticators have sufficient strength of mechanism for their intended use through the required instructions as provided for CCI-000192, CCI-000193, CCI-000194, CCI-000195, CCI-000196, CCI-000197, CCI-000198, CCI-000199, CCI-000200, CCI-000205, CCI-001544, CCI-001610, CCI-001611, CCI-001612, CCI-001613. Where these requirements conflict the contractor is instructed to apply the following order of precedence: 1) If present, Device Specific Requirements take precedence over any other requirements; and then 2) multifactor authentication requirements take precedence over password requirements.
CCI-001615	IA-5(1)(b)	The organization defines the minimum number of characters that are changed when new passwords are created.	DoD-Defined Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	This is met by the contractor ensuring that authenticators have sufficient strength of mechanism for their intended use through the required instructions as provided for CCI-000192, CCI-000193, CCI-000194, CCI-000195, CCI-000196, CCI-000197, CCI-000198, CCI-000199, CCI-000200, CCI-000205, CCI-001544, CCI-001610, CCI-001611, CCI-001612, CCI-001613, CCI-001614. Where these requirements conflict the contractor is instructed to apply the following order of precedence: 1) If present, Device Specific Requirements take precedence over any other requirements; and then 2) multifactor authentication requirements take precedence over password requirements.
CCI-001616	IA-5(1)(d)	The organization defines minimum password lifetime restrictions.	DoD-Defined Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	This is met by the contractor ensuring that authenticators have sufficient strength of mechanism for their intended use through the required instructions as provided for CCI-000192, CCI-000193, CCI-000194, CCI-000195, CCI-000196, CCI-000197, CCI-000198, CCI-000199, CCI-000200, CCI-000205, CCI-001544, CCI-001610, CCI-001611, CCI-001612, CCI-001613, CCI-001614, CCI-001615. Where these requirements conflict the contractor is instructed to apply the following order of precedence: 1) If present, Device Specific Requirements take precedence over any other requirements; and then 2) multifactor authentication requirements take precedence over password requirements.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-001617	IA-5(1)(d)	The organization defines maximum password lifetime restrictions.	DoD-Defined Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	This is met by the contractor ensuring that authenticators have sufficient strength of mechanism for their intended use through the required instructions as provided for CCI-000192, CCI-000193, CCI-000194, CCI-000195, CCI-000196, CCI-000197, CCI-000198, CCI-000199, CCI-000200, CCI-000205, CCI-001544, CCI-001610, CCI-001611, CCI-001612, CCI-001613, CCI-001614, CCI-001615, CCI-001616. Where these requirements conflict the contractor is instructed to apply the following order of precedence: 1) If present, Device Specific Requirements take precedence over any other requirements; and then 2) multifactor authentication requirements take precedence over password requirements.
CCI-001618	IA-5(1)(e)	The organization defines the number of generations for which password reuse is prohibited.	DoD-Defined Enclave Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	This is met by the contractor ensuring that authenticators have sufficient strength of mechanism for their intended use through the required instructions as provided for CCI-000192, CCI-000193, CCI-000194, CCI-000195, CCI-000196, CCI-000197, CCI-000198, CCI-000199, CCI-000200, CCI-000205, CCI-001544, CCI-001610, CCI-001611, CCI-001612, CCI-001613, CCI-001614, CCI-001615, CCI-001616, CCI-001617. Where these requirements conflict the contractor is instructed to apply the following order of precedence: 1) If present, Device Specific Requirements take precedence over any other requirements; and then 2) multifactor authentication requirements take precedence over password requirements. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06)
CCI-001619	IA-5(1)(a)	The information system enforces password complexity by the minimum number of special characters used.	Enclave Designer	USER IDENTIFICATION AND AUTHENTICATION	This is met by the contractor ensuring that authenticators have sufficient strength of mechanism for their intended use through the required instructions as provided for CCI-000192, CCI-000193, CCI-000194, CCI-000195, CCI-000196, CCI-000197, CCI-000198, CCI-000199, CCI-000200, CCI-000205, CCI-001544, CCI-001610, CCI-001611, CCI-001612, CCI-001613, CCI-001614, CCI-001615, CCI-001616, CCI-001617, CCI-001618. Where these requirements conflict the contractor is instructed to apply the following order of precedence: 1) If present, Device Specific Requirements take precedence over any other requirements; and then 2) multifactor authentication requirements take precedence over password requirements. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06)

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-001641	RA-5(a)	The organization defines the process for conducting random vulnerability scans on the information system and hosted applications.	Enclave Designer Non-Designer Impractical	VULNERABILITY SCANNING	This is partially met by requiring the contractor to ensure that all IP devices must be scannable, such that the device can be scanned by industry standard IP network scanning utilities without harm to the device, application, or functionality. For controllers, contractor must provide controllers that are scannable by standard control system discovery tools or control system browsers and return meaningful status information including the network inputs and outputs for the controller.This information must contain sufficient detail to detect vulnerabilities or exploits of the controller. Contractor must provide all software needed to scan the control system as the Control System Scanning Tools submittal. If the software required to scan the system is already installed at the project site or is provided under a separate section instead contractor must provide a statement indicating this. The organization is responsible to scan for vulnerabilities in the system and hosted applications according to the DoD defined frequency of every 30 days or as directed by an authoritative source (e.g. IAVM, CTOs, DTMs, STIGs) upon final acceptance of the system.
CCI-001643	RA-5(a)	The organization scans for vulnerabilities in the information system and hosted applications in accordance with the organization-defined process for random scans.	Enclave Designer Non-Designer	VULNERABILITY SCANNING	This is partially met by requiring the contractor to ensure that all IP devices must be scannable, such that the device can be scanned by industry standard IP network scanning utilities without harm to the device, application, or functionality. For controllers, contractor must provide controllers that are scannable by standard control system discovery tools or control system browsers and return meaningful status information including the network inputs and outputs for the controller.This information must contain sufficient detail to detect vulnerabilities or exploits of the controller. Contractor must provide all software needed to scan the control system as the Control System Scanning Tools submittal. If the software required to scan the system is already installed at the project site or is provided under a separate section instead contractor must provide a statement indicating this. The organization is responsible to scan for vulnerabilities in the system and hosted applications according to the DoD defined frequency of every 30 days or as directed by an authoritative source (e.g. IAVM, CTOs, DTMs, STIGs), and to document the vulnerability scans as an audit trail for future reference. The audit trail must be maintained IAW DoD, CYBERCOM, or component policies upon final acceptance of
CCI-001755	CM-6(c)	The organization defines the information system components for which any deviation from the established configuration settings are to be identified, documented and approved.	DoD-Defined Designer Non-Designer Impractical	REQUIREMENTS FOR LEAST FUNCTIONALITY	This is met by requiring the Contractor to ensure that IP Networks must be Ethernet networks and must use switches which are Ethernet Switches as defined in this Section. Contractor must not use nonsecure functions, ports, protocols and services as defined in DODI 8551.01 unless those ports, protocols and services are specifically required by the control system specifications or otherwise specifically authorized by the Government. Contractor must not use, and/or must physically disable or remove ports, protocols and services that are not specified in the control system specifications or required for operation of the control system. For devices that have a STIG or SRG related to Requirements for Least Functionality (such as configuration settings and port and device I/O access for least functionality), Contractor is required to install and configure the device in accordance with that STIG or SRGs.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-001761	CM-7(1)(b)	The organization defines the functions, ports, protocols and services within the information system that are to be disabled when deemed unnecessary and/or nonsecure.	Designer	IP Control Networks REQUIREMENTS FOR LEAST FUNCTIONALITY	The organization is responsible for defining the functions, ports, protocols and services within the control system that are to be disabled when deemed unnecessary and/or nonsecure.
CCI-001762	CM-7(1)(b)	The organization disables organization-defined functions, ports, protocols, and services within the information system deemed to be unnecessary and/or nonsecure.	Designer Impractical	IP Control Networks REQUIREMENTS FOR LEAST FUNCTIONALITY	This is met by requiring the Contractor to ensure that IP Networks must be Ethernet networks and must use switches which are Ethernet Switches as defined in this Section. Contractor must not use nonsecure functions, ports, protocols and services as defined in DODI 8551.01 unless those ports, protocols and services are specifically required by the control system specifications or otherwise specifically authorized by the Government. Contractor must not use, and/or must physically disable or remove ports, protocols and services that are not specified in the control system specifications or required for operation of the control system. For devices that have a STIG or SRG related to Requirements for Least Functionality (such as configuration settings and port and device I/O access for least functionality), Contractor is required to install and configure the device in accordance with that STIG or SRGs.
CCI-001889	AU-8(b)	The information system records time stamps for audit records that meets organization-defined granularity of time measurement.	Designer	Audit Time Stamps	The contractor is responsible for configuring the control system device(s) to record time stamps for audit records that meets organization-defined granularity of time measurement. For control system components that have applicable STIGs or SRGs, the contractor must comply with the STIG/SRG guidance that pertains to CCI-001889. DoD has defined the granularity of time measurement as one second.
CCI-001890	AU-8(b)	The information system records time stamps for audit records that can be mapped to Coordinated Universal Time (UTC) or Greenwich Mean Time (GMT).	Designer	Audit Time Stamps	The contractor is responsible for configuring the control system device(s) to record time stamps for audit records that can be mapped to Coordinated Universal Time (UTC) or Greenwich Mean Time (GMT). For control system components that have applicable STIGs or SRGs, the contractor must comply with the STIG/SRG guidance that pertains to CCI-001890.
CCI-001910	AU-12(b)	The organization defines the personnel or roles allowed select which auditable events are to be audited by specific components of the information system.	DoD-Defined Designer Impractical	Audit Events, Content of Audit Records, and Audit Generation	This is met by requiring the contractor to configure the controller to generate audit records for the defined subset of the auditable events defined in AU-2, CCI-000126, which are listed the events listed in AU-2 (a), CCI-000123 per occurrence as required by DoD, which will contain information that establishes the outcome of the event as defined by AU-3, CCI-000134. Contractor is required to determine and apply all applicable STIGs/SRGs applicable STIGs or SRGs that pertains to CCI-000172. For controllers with the capability to store audit records, contractor to configure the generating and storing audit records locally in its internal memory for these records to be retrieved and reviewed during routine maintenance or inspection by the ISSM or individual appointed by the ISSM upon final acceptance of the control system. Contractor to provide step-by-step documentation for this process as a part of the control systems final CYBERSECURITY DOCUMENTATION submittal.
CCI-001953	IA-2(12)	The information system accepts Personal Identity Verification (PIV) credentials.	Enclave Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	Impractical; the controllers do not support connectivity to a central validation system. The controllers do not support the use of PIV authentication.
CCI-001954	IA-2(12)	The information system electronically verifies Personal Identity Verification (PIV) credentials.	Enclave Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	Impractical; the controllers do not support connectivity to a central validation system. The controllers do not support the use of PIV authentication.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-001958	IA-3	The information system authenticates an organization defined list of specific and/or types of devices before establishing a local, remote, or network connection.	Enclave Designer Impractical	Control System Inventory Report Device Identification and Authentication	This is partially met by requiring the contractor to provide a Control System Inventory Report using the most current Inventory Spreadsheet listed at the www.wbdg.org documenting all devices, including networked devices, network infrastructure devices, non-networked devices, input devices (e.g. sensors) and output devices (e.g. actuators). For each device provide all applicable information for which there is a field on the spreadsheet in accordance with the instructions on the spreadsheet. Contractor is required to determine and apply all applicable STIGs/SRGs. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06).
CCI-001989	IA-5(e)	The organization manages information system authenticators by changing default content of authenticators prior to information system installation.	Designer	USER IDENTIFICATION AND AUTHENTICATION	This is met by requiring the contractor to provide a Confidential Password Report for all devices with a password which documents a change of all passwords from the default password as part of the final CYBERSECURITY DOCUMENTATION submittal package. The Contractor is required to coordinate selection of passwords with the site designated Password Point of Contact. Contractor may not use the same password for more than one device unless specifically instructed to do so. Contractor is required to provide the Confidential Password Report which shall include documenting the password for each device and describing the procedure to change the password for each device.
CCI-002002	IA-5(11)	The organization defines the token quality requirements to be employed by the information system mechanisms for token-based authentication.	DoD-Defined Enclave Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	Impractical; the BAS controllers do not support token-based authentication.
CCI-002003	IA-5(11)	The information system, for token-based authentication, employs mechanisms that satisfy organization-defined token quality requirements.	Enclave Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	Impractical; the BAS controllers do not support token-based authentication.
CCI-002041	IA-5(1)(f)	The information system allows the use of a temporary password for system logons with an immediate change to a permanent password.	Enclave Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	Not applicable at the controller; This is managed at PIT L2 computer or above which allows for minimum lifetime of 24 hours which allows the use of a temporary password for system logons with an immediate change to a permanent password.
CCI-002102	CA-9(a)	The organization defines the information system components or classes of components that that are authorized internal connections to the information system.	Designer	Network Communication Report	This is met by requiring the contractor to provide a network communication report. For each networked device, contractor is required to document the communication characteristics of the device including communication protocols, services used, encryption employed, and a general description of what information is communicated over the network. For each device using IP, contractor is required to document all TCP and UDP ports used. For non-IP communications, contractor is required to document communication protocol and media used. The organization is responsible to define and document any other system components or classes of components that that are authorized internal connections to the system upon final acceptance of the system as DoD has determined the information system components are not appropriate to define at the Enterprise level.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-002103	CA-9(b)	The organization documents, for each internal connection, the interface characteristics.	Designer	Network Communication Report	This is met by requiring the contractor to provide a network communication report. For each networked device, contractor is required to document the communication characteristics of the device including communication protocols, services used, encryption employed, and a general description of what information is communicated over the network. For each device using IP, contractor is required to document all TCP and UDP ports used. For non-IP communications, contractor is required to document communication protocol and media used.
CCI-002104	CA-9(b)	The organization documents, for each internal connection, the security requirements.	Designer	Network Communication Report	This is met by requiring the contractor to provide a network communication report. For each networked device, contractor is required to document the communication characteristics of the device including communication protocols, services used, encryption employed, and a general description of what information is communicated over the network. For each device using IP, contractor is required to document all TCP and UDP ports used. For non-IP communications, contractor is required to document communication protocol and media used. Contractor is required to provide a copy of a riser diagram in one-line format overlayed on a facility schematic as part of the final CYBERSECURITY DOCUMENTATION.
CCI-002105	CA-9(b)	The organization documents, for each internal connection, the nature of the information communicated.	Designer	Network Communication Report	This is met by requiring the contractor to provide a network communication report. For each networked device, contractor is required to document the communication characteristics of the device including communication protocols, services used, encryption employed, and a general description of what information is communicated over the network. For each device using IP, contractor is required to document all TCP and UDP ports used. For non-IP communications, contractor is required to document communication protocol and media used. Contractor is required to provide a copy of a riser diagram in one-line format overlayed on a facility schematic as part of the final CYBERSECURITY DOCUMENTATION. The contractor is required to provide any documentation or submittals related to network communication, such as Points Schedules (CCI-002105). If the control system's specifications require a riser diagram submittal that meets this requirement, the contractor can provide a copy of that submittal instead as the cybersecurity riser diagram as part of the final CYBERSECURITY DOCUMENTATION.
CCI-002110	AC-2(a)	The organization defines the information system account types that support the organizational missions/business functions.	Designer	User Accounts	This is met by requiring the contractor to ensure that any user interface supporting user accounts (either FULLY or MINIMALLY) must limit access according to specified limitations for each account, as that system is designed and as provided by the organization as DoD has DoD has determined the information system account types are not appropriate to define at the Enterprise level which determine system account types that support the organizational missions/business functions.
CCI-002236	AC-7(b)	The organization defines the time period the information system will automatically lock the account or node when the maximum number of unsuccessful attempts is exceeded.	DoD-Defined Designer Impractical	Unsuccessful Logon Attempts	For Devices MINIMALLY Supporting Accounts and Devices FULLY Supporting Accounts, this is met by requiring the contractor to configure the device to ensure that once an account is locked, the account must stay locked until unlocked by an administrator. If the account being locked is the sole administrator account on the device, the account must stay locked for one hour and then automatically unlock.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-002237	AC-7(b)	The organization defines the delay algorithm to be employed by the information system to delay the next login prompt when the maximum number of unsuccessful attempts is exceeded.	DoD-Defined Designer Impractical	Unsuccessful Logon Attempts	For Devices MINIMALLY Supporting Accounts and Devices FULLY Supporting Accounts, this is met by requiring the contractor to configure the device to delay the next login prompt according to the DoD Defined Algorith of five Seconds.
CCI-002238	AC-7(b)	The information system automatically locks the account or node for either an organization-defined time period, until the locked account or node is released by an administrator, or delays the next login prompt according to the organization-defined delay algorithm when the maximum number of unsuccessful attempts is exceeded.	Designer Impractical	Unsuccessful Logon Attempts	For Devices MINIMALLY Supporting Accounts and Devices FULLY Supporting Accounts, this is met by requiring the contractor to configure the device to ensure the locked account is released by an administrator and delays the next login prompt for a minimum of five seconds when the maximum number of unsuccessful attempts is exceeded. Contractor is required to determine and apply applicable STIGs or SRGs that pertains to CCI-002238.
CCI-002243	AC-8(a)(1)	The organization-defined information system use notification message or banner is to state that users are accessing a U.S. Government information system.	DoD-Defined Enclave Designer Impractical	System Use Notification	See CCI-000048
CCI-002244	AC-8(a)(2)	The organization-defined information system use notification message or banner is to state that information system usage may be monitored, recorded, and subject to audit.	DoD-Defined Enclave Designer Impractical	System Use Notification	See CCI-000048
CCI-002245	AC-8(a)(3)	The organization-defined information system use notification message or banner is to state that unauthorized use of the information system is prohibited and subject to criminal and civil penalties.	DoD-Defined Enclave Designer Impractical	System Use Notification	See CCI-000048
CCI-002246	AC-8(a)(4)	The organization-defined information system use notification message or banner is to state that use of the information system indicates consent to monitoring and recording.	DoD-Defined Enclave Designer Impractical	System Use Notification	See CCI-000048
CCI-002247	AC-8(a)	The organization defines the use notification message or banner the information system displays to users before granting access to the system.	DoD-Defined Enclave Designer Impractical	System Use Notification	See CCI-000048
CCI-002248	AC-8(c)(1)	The organization defines the conditions of use which are to be displayed to users of the information system before granting further access.	DoD-Defined Enclave Designer Impractical	System Use Notification	See CCI-000048
CCI-002323	AC-18(a)	The organization establishes configuration/connection requirements for wireless access.	Designer Non-Designer	Wireless and Wired Broadcast Communication	Wireless communication is not authorized for this project.
CCI-002449	SC-13	The organization defines the cryptographic uses, and type of cryptography required for each use, to be implemented by the information system.	DoD-Defined Enclave Designer Impractical	Cryptographic Protection	The organization is responsible for defining the cryptographic uses, and type of cryptography required for each use, to be implemented by the control system.
CCI-002450	SC-13	The information system implements organization-defined cryptographic uses and type of cryptography required for each use in accordance with applicable federal laws, Executive Orders, directives, policies, regulations, and standards.	Enclave Designer Impractical	Cryptographic Protection	This is addressed by requiring and employing encrypted sessions for communications.
CCI-002530	SC-39	The information system maintains a separate execution domain for each executing process.	Designer	---	Impractical; the BAS controllers do not support this functionality.
CCI-002544	SC-41	The organization defines the information systems or information system components on which organization-defined connection ports or input/output devices are to be physically disabled or removed.	Enclave Designer Non-Designer	IP Control Networks REQUIREMENTS FOR LEAST FUNCTIONALITY	The organization is responsible for defining the control systems or control system components on which organization-defined connection ports or input/output devices are to be physically disabled or removed.
CCI-002545	SC-41	The organization defines the connection ports or input/output devices that are to be physically disabled or removed from organization-defined information systems or information system components.	Enclave Designer Non-Designer	IP Control Networks REQUIREMENTS FOR LEAST FUNCTIONALITY	The organization is responsible for defining the connection ports or input/output devices that are to be physically disabled or removed from organization-defined control systems or control system components.
CCI-002546	SC-41	The organization physically disables or removes organization-defined connection ports or input/output devices on organization-defined information systems or information system components.	Designer Impractical	IP Control Networks REQUIREMENTS FOR LEAST FUNCTIONALITY	The contractor is responsible for physically disabling or removing organization-defined connection ports or input/output devices on organization-defined information systems or control system components.
CCI-002623	SI-3(c)(1)	The organization defines the frequency for performing periodic scans of the information system for malicious code.	DoD-Defined Designer Impractical	Malicious Code Protection	Impractical; only applicable at the computer level.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-002645	SI-4(b)	The organization defines the techniques and methods to be used to identify unauthorized use of the information system.	Enclave Designer Non-Designer	Information System Monitoring	This is partially met by requiring the contractor to provide all control system Cybersecurity Documentation in accordance with all required Control System Cybersecurity Documentation submittals as applicable which documents techniques and methods to be used to identify unauthorized use of the control system. For all other requirements, the organization is responsible to determine any additional techniques and methods (such as use of/connection to and enclave) as DoD has determined these are not appropriate to define at the Enterprise level. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06).
CCI-002773	SI-17	The organization defines the fail-safe procedures to be implemented by the information system when organization-defined failure conditions occur.	Designer	Control System Inventory Report SAFE MODE AND FAIL SAFE OPERATION	This is partially met by requiring the contractor to provide a Control System Inventory Report using the most current Inventory Spreadsheet listed at the www.wbdg.org documenting all devices, including networked devices, network infrastructure devices, non-networked devices, input devices (e.g. sensors) and output devices (e.g. actuators). For each device provide all applicable information for which there is a field on the spreadsheet in accordance with the instructions on the spreadsheet. Contractor is required to determine and apply all applicable STIGs/SRGs. Fail-safe procedures to be implemented by the control system are defined in that system's specification's section of its sequence of operations as designed by the Lead Engineer of the control system. For all control system components with an applicable STIG or SRG, contractor to configure the component in accordance with all applicable STIGs and SRGs.
CCI-002774	SI-17	The organization defines the failure conditions which, when they occur, will result in the information system implementing organization-defined fail-safe procedures.	Designer	Control System Inventory Report SAFE MODE AND FAIL SAFE OPERATION	This is partially met by requiring the contractor to provide a Control System Inventory Report using the most current Inventory Spreadsheet listed at the www.wbdg.org documenting all devices, including networked devices, network infrastructure devices, non-networked devices, input devices (e.g. sensors) and output devices (e.g. actuators). For each device provide all applicable information for which there is a field on the spreadsheet in accordance with the instructions on the spreadsheet. Contractor is required to determine and apply all applicable STIGs/SRGs. Fail-safe procedures to be implemented by the control system are defined in that system's specification's section of its sequence of operations as designed by the Lead Engineer of the control system. For all control system components with an applicable STIG or SRG, contractor to configure the component in accordance with all applicable STIGs and SRGs.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-002775	SI-17	The information system implements organization-defined fail-safe procedures when organization-defined failure conditions occur.	Designer	Control System Inventory Report SAFE MODE AND FAIL SAFE OPERATION	This is partially met by requiring the contractor to provide a Control System Inventory Report using the most current Inventory Spreadsheet listed at the www.wbdg.org documenting all devices, including networked devices, network infrastructure devices, non-networked devices, input devices (e.g. sensors) and output devices (e.g. actuators). For each device provide all applicable information for which there is a field on the spreadsheet in accordance with the instructions on the spreadsheet. Contractor is required to determine and apply all applicable STIGs/SRGs. Fail-safe procedures to be implemented by the control system are defined in that system's specification's section of its sequence of operations as designed by the Lead Engineer of the control system. For all control system components with an applicable STIG or SRG, contractor to configure the component in accordance with all applicable STIGs and SRGs.
CCI-002855	CP-12	The information system, when organization-defined conditions are detected, enters a safe mode of operation with organization-defined restrictions of safe mode of operation.	Designer	SAFE MODE AND FAIL SAFE OPERATION	This is met through the Engineering Design Process as defineed by UFC 1-200-01 DoD Building Code that is the foundational document of the UFC program in providing general building requirements and overarching criteria and documents. Throughout the Design process, the Lead Engineer coordinates with the organization to any requirements for the control system needed to meet CP-12, Safe Mode or SI-17, Fail-Safe Procedures to determine/define when organization-defined conditions are detected, the control system will enter a safe mode of operation with organization-defined restrictions of safe mode of operation. The contractor is then required to determine all applicable STIGs or SRGs, and then to configure the component in accordance with all applicable STIGs and SRGs.
CCI-002856	CP-12	The organization defines the conditions, that when detected, the information system enters a safe mode of operation with organization-defined restrictions of safe mode of operation.	Designer	SAFE MODE AND FAIL SAFE OPERATION	This is met through the Engineering Design Process as defineed by UFC 1-200-01 DoD Building Code that is the foundational document of the UFC program in providing general building requirements and overarching criteria and documents. Throughout the Design process, the Lead Engineer coordinates with the organization to define any requirements for the control system needed to meet CP-12, Safe Mode or SI-17, Fail-Safe Procedures to be implemented by the control system when the control system enters a safe mode of operation with organization-defined restrictions of safe mode of operation as DoD has determined the fail-safe procedures are not appropriate to define at the Enterprise level. The contractor is then required to determine all applicable STIGs or SRGs, and then to configure the component in accordance with all applicable STIGs and SRGs.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-002857	CP-12	The organization defines the restrictions of safe mode of operation that the information system will enter when organization-defined conditions are detected.	Designer	SAFE MODE AND FAIL SAFE OPERATION	This is met through the Engineering Design Process as defineed by UFC 1-200-01 DoD Building Code that is the foundational document of the UFC program in providing general building requirements and overarching criteria and documents. Throughout the Design process, the Lead Engineer coordinates with the organization to define any requirements for the control system needed to meet CP-12, Safe Mode or SI-17, Fail-Safe Procedures to be implemented by the control system when organization-defined conditions are detected as DoD has determined the restrictions on safe mode of operation are not appropriate to define at the Enterprise level. The contractor is then required to determine all applicable STIGs or SRGs, and then to configure the component in accordance with all applicable STIGs and SRGs.
CCI-003051	PL-2(a)(2)	The organizations security plan for the information system explicitly defines the authorization boundary for the system.	Enclave Designer Non-Designer	Cybersecurity Riser Diagram	Contractor is required to provide a copy of a riser diagram in one-line format overlayed on a facility schematic as part of the final CYBERSECURITY DOCUMENTATION which defines the authorization boundary for the system. The organization is responsible to use this diagram to explicitly define within the security plan the authorization boundary for the system upon final acceptance of the system. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06).
CCI-003053	PL-2(a)(4)	The organizations security plan for the information system provides the security categorization of the information system including supporting rationale.	Designer Non-Designer	Cybersecurity Riser Diagram	Contractor is required to provide a copy of a riser diagram in one-line format overlayed on a facility schematic as part of the final CYBERSECURITY DOCUMENTATION which defines the authorization boundary for the system. The organization is responsible to use this diagram as the supporting rationale to define within the security plan the security categorization of the system including upon final acceptance.
CCI-003116	SA-4(10)	The organization employs only information technology products on the FIPS 201-approved products list for Personal Identity Verification (PIV) capability implemented within organizational information systems.	Enclave Designer Impractical	FIPS 201-2 REQUIREMENT	Impractical; the controllers do not support connectivity to a central validation system. The controllers do not support the use of PIV authentication.
CCI-003124	SA-5(a)(1)	The organization obtains administrator documentation for the information system, system component, or information system services that describes secure configuration of the system, component, or service.	Designer Non-Designer	Control System Cybersecurity Documentation	This is met by requiring the contractor to provide all administrator documentation that describes secure configuration of the controller/device.
CCI-003125	SA-5(a)(1)	The organization obtains administrator documentation for the information system, system component, or information system services that describes secure installation of the system, component, or service.	Designer Non-Designer	Control System Cybersecurity Documentation	This is met by requiring the contractor to provide all administrator documentation that describes secure configuration of the controller/device, or or a specific indication that there are no secure configuration steps that apply as necessary.
CCI-003126	SA-5(a)(1)	The organization obtains administrator documentation for the information system, system component, or information system services that describes secure operation of the system, component, or service.	Designer Non-Designer	Control System Cybersecurity Documentation	This is met by requiring the contractor to provide all administrator documentation that describes secure operation of the controller/device, or or a specific indication that there are no secure configuration steps that apply as necessary.
CCI-003127	SA-5(a)(2)	The organization obtains administrator documentation for the information system, system component, or information system services that describes effective use and maintenance of security functions/mechanisms.	Designer Non-Designer	Control System Cybersecurity Documentation	This is met by requiring the contractor to provide all administrator documentation that describes effective use and maintenance of security functions or mechanisms for the controller/device, or a specific indication that there are no security functions or mechanisms in the device as necessary.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-003128	SA-5(a)(3)	The organization obtains administrator documentation for the information system, system component, or information system services that describes known vulnerabilities regarding configuration and use of administrative (i.e. privileged) functions.	Designer Non-Designer	Control System Cybersecurity Documentation	This is met by requiring the contractor to provide all administrator documentation that describes known vulnerabilities regarding configuration and use of administrative (i.e. privileged) functions for the device.
CCI-003129	SA-5(b)(1)	The organization obtains user documentation for the information system, system component, or information system service that describes user-accessible security functions/mechanisms and how to effectively use those security functions/mechanisms.	Designer Non-Designer	Control System Cybersecurity Documentation	This is met by requiring the contractor to provide documentation that describes user-accessible security functions or mechanisms in the device and how to effectively use those security functions or mechanisms; or a specific indication that there are no user-accessible security functions or mechanisms in the device.
CCI-003130	SA-5(b)(2)	The organization obtains user documentation for the information system, system component or information system service that describes methods for user interaction which enables individuals to use the system, component, or service in a more secure manner.	Designer Non-Designer	Control System Cybersecurity Documentation	This is met by requiring the contractor must provide documentation that describes methods for user interaction which enables individuals to use the device in a more secure manner.
CCI-003131	SA-5(b)(3)	The organization obtains user documentation for the information system, system component or information system service that describes user responsibilities in maintaining the security of the system, component, or service.	Designer Non-Designer	Control System Cybersecurity Documentation Software Applications	This is met by requiring the contractor must provide documentation that describes methods for user interaction which enables individuals to use the device in a more secure manner.

Starting Control Set and Tailoring Recommendations

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
AC-1	ACCESS CONTROL POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. An access control policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the access control policy and associated access controls; and b. Reviews and updates the current: 1. Access control policy [Assignment: organization-defined frequency]; and 2. Access control procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AC-2	ACCOUNT MANAGEMENT	The organization: a. Identifies and selects the following types of information system accounts to support organizational missions/business functions: [Assignment: organization-defined information system account types]; b. Assigns account managers for information system accounts; c. Establishes conditions for group and role membership; d. Specifies authorized users of the information system, group and role membership, and access authorizations (i.e., privileges) and other attributes (as required) for each account; e. Requires approvals by [Assignment: organization-defined personnel or roles] for requests to create information system accounts; f. Creates, enables, modifies, disables, and removes information system accounts in accordance with [Assignment: organization-defined procedures or conditions]; g. Monitors the use of information system accounts; h. Notifies account managers: 1. When accounts are no longer required; 2. When users are terminated or transferred; and 3. When individual information system usage or need-to-know changes; i. Authorizes access to the information system based on: 1. A valid access authorization; 2. Intended system usage; and 3. Other attributes as required by the organization or associated missions/business functions; j. Reviews accounts for compliance with account management requirements [Assignment: organization-defined frequency]; and k. Establishes a process for reissuing shared/group account credentials (if deployed) when individuals are removed from the group.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AC-3	ACCESS ENFORCEMENT	The information system enforces approved authorizations for logical access to information and system resources in accordance with applicable access control policies.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AC-7	UNSUCCESSFUL LOGIN ATTEMPTS	The information system: a. Enforces a limit of [Assignment: organization-defined number] consecutive invalid logon attempts by a user during a [Assignment: organization-defined time period]; and b. Automatically [Selection: locks the account/node for an [Assignment: organization-defined time period]; locks the account/node until released by an administrator; delays next logon prompt according to [Assignment: organization-defined delay algorithm]] when the maximum number of unsuccessful attempts is exceeded.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AC-8	SYSTEM USE NOTIFICATION	The information system: a. Displays to users [Assignment: organization-defined system use notification message or banner] before granting access to the system that provides privacy and security notices consistent with applicable federal laws, Executive Orders, directives, policies, regulations, standards, and guidance and states that: 1. Users are accessing a U.S. Government information system; 2. Information system usage may be monitored, recorded, and subject to audit; 3. Unauthorized use of the information system is prohibited and subject to criminal and civil penalties; and 4. Use of the information system indicates consent to monitoring and recording; b. Retains the notification message or banner on the screen until users acknowledge the usage conditions and take explicit actions to log on to or further access the information system; and c. For publicly accessible systems: 1. Displays system use information [Assignment: organization-defined conditions], before granting further access; 2. Displays references, if any, to monitoring, recording, or auditing that are consistent with privacy accommodations for such systems that generally prohibit those activities; and 3. Includes a description of the authorized uses of the system.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AC-14	PERMITTED ACTIONS WITHOUT IDENTIFICATION OR AUTHENTICATION	The organization: a. Identifies [Assignment: organization-defined user actions] that can be performed on the information system without identification or authentication consistent with organizational missions/business functions; and b. Documents and provides supporting rationale in the security plan for the information system, user actions not requiring identification or authentication.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AC-17	REMOTE ACCESS	The organization: a. Establishes and documents usage restrictions, configuration/connection requirements, and implementation guidance for each type of remote access allowed; and b. Authorizes remote access to the information system prior to allowing such connections.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AC-18	WIRELESS ACCESS	The organization: a. Establishes usage restrictions, configuration/connection requirements, and implementation guidance for wireless access; and b. Authorizes wireless access to the information system prior to allowing such connections.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AC-19	ACCESS CONTROL FOR MOBILE DEVICES	The organization: a. Establishes usage restrictions, configuration requirements, connection requirements, and implementation guidance for organization-controlled mobile devices; and b. Authorizes the connection of mobile devices to organizational information systems.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
AC-20	USE OF EXTERNAL INFORMATION SYSTEMS	The organization establishes terms and conditions, consistent with any trust relationships established with other organizations owning, operating, and/or maintaining external information systems, allowing authorized individuals to: a. Access the information system from external information systems; and b. Process, store, or transmit organization-controlled information using external information systems.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AC-21	INFORMATION SHARING	The organization: a. Facilitates information sharing by enabling authorized users to determine whether access authorizations assigned to the sharing partner match the access restrictions on the information for [Assignment: organization-defined information sharing circumstances where user discretion is required]; and b. Employs [Assignment: organization-defined automated mechanisms or manual processes] to assist users in making information sharing/collaboration decisions.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AC-22	PUBLICLY ACCESSIBLE CONTENT	The organization: a. Designates individuals authorized to post information onto a publicly accessible information system; b. Trains authorized individuals to ensure that publicly accessible information does not contain nonpublic information; c. Reviews the proposed content of information prior to posting onto the publicly accessible information system to ensure that nonpublic information is not included; and d. Reviews the content on the publicly accessible information system for nonpublic information [Assignment: organization-defined frequency] and removes such information, if discovered.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AT-1	SECURITY AWARENESS AND TRAINING POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A security awareness and training policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the security awareness and training policy and associated security awareness and training controls; and b. Reviews and updates the current: 1. Security awareness and training policy [Assignment: organization-defined frequency]; and 2. Security awareness and training procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AT-2	SECURITY AWARENESS TRAINING	The organization provides basic security awareness training to information system users (including managers, senior executives, and contractors): a. As part of initial training for new users; b. When required by information system changes; and c. [Assignment: organization-defined frequency] thereafter.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AT-3	ROLE-BASED SECURITY TRAINING	The organization provides role-based security training to personnel with assigned security roles and responsibilities: a. Before authorizing access to the information system or performing assigned duties; b. When required by information system changes; and c. [Assignment: organization-defined frequency] thereafter.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AT-4	SECURITY TRAINING RECORDS	The organization: a. Documents and monitors individual information system security training activities including basic security awareness training and specific information system security training; and b. Retains individual training records for [Assignment: organization-defined time period].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AU-1	AUDIT AND ACCOUNTABILITY POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. An audit and accountability policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the audit and accountability policy and associated audit and accountability controls; and b. Reviews and updates the current: 1. Audit and accountability policy [Assignment: organization-defined frequency]; and 2. Audit and accountability procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AU-2	AUDIT EVENTS	The organization: a. Determines that the information system is capable of auditing the following events: [Assignment: organization-defined auditable events]; b. Coordinates the security audit function with other organizational entities requiring audit-related information to enhance mutual support and to help guide the selection of auditable events; c. Provides a rationale for why the auditable events are deemed to be adequate to support after-the-fact investigations of security incidents; and d. Determines that the following events are to be audited within the information system: [Assignment: organization-defined audited events (the subset of the auditable events defined in AU-2 a.) along with the frequency of (or situation requiring) auditing for each identified event].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AU-3	CONTENT OF AUDIT RECORDS	The information system generates audit records containing information that establishes what type of event occurred, when the event occurred, where the event occurred, the source of the event, the outcome of the event, and the identity of any individuals or subjects associated with the event.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AU-4	AUDIT STORAGE CAPACITY	The organization allocates audit record storage capacity in accordance with [Assignment: organization-defined audit record storage requirements].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AU-4(1)	AUDIT STORAGE CAPACITY | TRANSFER TO ALTERNATE STORAGE	The information system off-loads audit records [Assignment: organization-defined frequency] onto a different system or media than the system being audited.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AU-5	RESPONSE TO AUDIT PROCESSING FAILURES	The information system: a. Alerts [Assignment: organization-defined personnel or roles] in the event of an audit processing failure; and b. Takes the following additional actions: [Assignment: organization-defined actions to be taken (e.g., shut down information system, overwrite oldest audit records, stop generating audit records)].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AU-6	AUDIT REVIEW, ANALYSIS, AND REPORTING	The organization: a. Reviews and analyzes information system audit records [Assignment: organization-defined frequency] for indications of [Assignment: organization-defined inappropriate or unusual activity]; and b. Reports findings to [Assignment: organization-defined personnel or roles].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
AU-8	TIME STAMPS	The information system: a. Uses internal system clocks to generate time stamps for audit records; and b. Records time stamps for audit records that can be mapped to Coordinated Universal Time (UTC) or Greenwich Mean Time (GMT) and meets [Assignment: organization-defined granularity of time measurement].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AU-9	PROTECTION OF AUDIT INFORMATION	The information system protects audit information and audit tools from unauthorized access, modification, and deletion.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AU-11	AUDIT RECORD RETENTION	The organization retains audit records for [Assignment: organization-defined time period consistent with records retention policy] to provide support for after-the-fact investigations of security incidents and to meet regulatory and organizational information retention requirements.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
AU-12	AUDIT GENERATION	The information system: a. Provides audit record generation capability for the auditable events defined in AU-2 at [Assignment: organization-defined information system components]; b. Allows [Assignment: organization-defined personnel or roles] to select which auditable events are to be audited by specific components of the information system; and c. Generates audit records for the audited events defined in AU-2 with the content defined in AU-3.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CA-1	SECURITY ASSESSMENT AND AUTHORIZATION POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A security assessment and authorization policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the security assessment and authorization policy and associated security assessment and authorization controls; and b. Reviews and updates the current: 1. Security assessment and authorization policy [Assignment: organization-defined frequency]; and 2. Security assessment and authorization procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CA-2	SECURITY ASSESSMENTS	The organization: a. Develops a security assessment plan that describes the scope of the assessment including: 1. Security controls and control enhancements under assessment; 2. Assessment procedures to be used to determine security control effectiveness; and 3. Assessment environment, assessment team, and assessment roles and responsibilities; b. Assesses the security controls in the information system and its environment of operation [Assignment: organization-defined frequency] to determine the extent to which the controls are implemented correctly, operating as intended, and producing the desired outcome with respect to meeting established security requirements; c. Produces a security assessment report that documents the results of the assessment; and d. Provides the results of the security control assessment to [Assignment: organization-defined individuals or roles].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CA-3	SYSTEM INTERCONNECTIONS	The organization: a. Authorizes connections from the information system to other information systems through the use of Interconnection Security Agreements; b. Documents, for each interconnection, the interface characteristics, security requirements, and the nature of the information communicated; and c. Reviews and updates Interconnection Security Agreements [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CA-5	PLAN OF ACTION AND MILESTONES	The organization: a. Develops a plan of action and milestones for the information system to document the organization's planned remedial actions to correct weaknesses or deficiencies noted during the assessment of the security controls and to reduce or eliminate known vulnerabilities in the system; and b. Updates existing plan of action and milestones [Assignment: organization-defined frequency] based on the findings from security controls assessments, security impact analyses, and continuous monitoring activities.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CA-6	SECURITY AUTHORIZATION	The organization: a. Assigns a senior-level executive or manager as the authorizing official for the information system; b. Ensures that the authorizing official authorizes the information system for processing before commencing operations; and c. Updates the security authorization [Assignment: organization - defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CA-7	CONTINUOUS MONITORING	The organization develops a continuous monitoring strategy and implements a continuous monitoring program that includes: a. Establishment of [Assignment: organization-defined metrics] to be monitored; b. Establishment of [Assignment: organization-defined frequencies] for monitoring and [Assignment: organization-defined frequencies] for assessments supporting such monitoring; c. Ongoing security control assessments in accordance with the organizational continuous monitoring strategy; d. Ongoing security status monitoring of organization-defined metrics in accordance with the organizational continuous monitoring strategy; e. Correlation and analysis of security-related information generated by assessments and monitoring; f. Response actions to address results of the analysis of security-related information; and g. Reporting the security status of organization and the information system to [Assignment: organization-defined personnel or roles] [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CA-9	INTERNAL SYSTEM CONNECTIONS	The organization: a. Authorizes internal connections of [Assignment: organization-defined information system components or classes of components] to the information system; and b. Documents, for each internal connection, the interface characteristics, security requirements, and the nature of the information communicated.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
CM-1	CONFIGURATION MANAGEMENT POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A configuration management policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the configuration management policy and associated configuration management controls; and b. Reviews and updates the current: 1. Configuration management policy [Assignment: organization-defined frequency]; and 2. Configuration management procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CM-2	BASELINE CONFIGURATION	The organization develops, documents, and maintains under configuration control, a current baseline configuration of the information system.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CM-4	SECURITY IMPACT ANALYSIS	The organization analyzes changes to the information system to determine potential security impacts prior to change implementation.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CM-6	CONFIGURATION SETTINGS	The organization: a. Establishes and documents configuration settings for information technology products employed within the information system using [Assignment: organization-defined security configuration checklists] that reflect the most restrictive mode consistent with operational requirements; b. Implements the configuration settings; c. Identifies, documents, and approves any deviations from established configuration settings for [Assignment: organization - defined information system components] based on [Assignment: organization-defined operational requirements]; and d. Monitors and controls changes to the configuration settings in accordance with organizational policies and procedures.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CM-7	LEAST FUNCTIONALITY	The organization: a. Configures the information system to provide only essential capabilities; and b. Prohibits or restricts the use of the following functions, ports, protocols, and/or services: [Assignment: organization-defined prohibited or restricted functions, ports, protocols, and/or services].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CM-7(1)	LEAST FUNCTIONALITY | PERIODIC REVIEW	The organization: (a) Reviews the information system [Assignment: organization-defined frequency] to identify unnecessary and/or nonsecure functions, ports, protocols, and services; and (b) Disables [Assignment: organization-defined functions, ports, protocols, and services within the information system deemed to be unnecessary and/or nonsecure].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CM-8	INFORMATION SYSTEM COMPONENT INVENTORY	The organization: a. Develops and documents an inventory of information system components that: 1. Accurately reflects the current information system; 2. Includes all components within the authorization boundary of the information system; 3. Is at the level of granularity deemed necessary for tracking and reporting; and 4. Includes [Assignment: organization-defined information deemed necessary to achieve effective information system component accountability]; and b. Reviews and updates the information system component inventory [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CM-10	SOFTWARE USAGE RESTRICTIONS	The organization: a. Uses software and associated documentation in accordance with contract agreements and copyright laws; b. Tracks the use of software and associated documentation protected by quantity licenses to control copying and distribution; and c. Controls and documents the use of peer-to-peer file sharing technology to ensure that this capability is not used for the unauthorized distribution, display, performance, or reproduction of copyrighted work.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CM-11	USER-INSTALLED SOFTWARE	The organization: a. Establishes [Assignment: organization-defined policies] governing the installation of software by users; b. Enforces software installation policies through [Assignment: organization-defined methods]; and c. Monitors policy compliance at [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CP-1	CONTINGENCY PLANNING POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A contingency planning policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the contingency planning policy and associated contingency planning controls; and b. Reviews and updates the current: 1. Contingency planning policy [Assignment: organization-defined frequency]; and 2. Contingency planning procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
CP-2	CONTINGENCY PLAN	The organization: a. Develops a contingency plan for the information system that: 1. Identifies essential missions and business functions and associated contingency requirements; 2. Provides recovery objectives, restoration priorities, and metrics; 3. Addresses contingency roles, responsibilities, assigned individuals with contact information; 4. Addresses maintaining essential missions and business functions despite an information system disruption, compromise, or failure; 5. Addresses eventual, full information system restoration without deterioration of the security safeguards originally planned and implemented; and 6. Is reviewed and approved by [Assignment: organization-defined personnel or roles]; b. Distributes copies of the contingency plan to [Assignment: organization-defined key contingency personnel (identified by name and/or by role) and organizational elements]; c. Coordinates contingency planning activities with incident handling activities; d. Reviews the contingency plan for the information system [Assignment: organization-defined frequency]; e. Updates the contingency plan to address changes to the organization, information system, or environment of operation and problems encountered during contingency plan implementation, execution, or testing; f. Communicates contingency plan changes to [Assignment: organization-defined key contingency personnel (identified by name and/or by role) and organizational elements]; and g. Protects the contingency plan from unauthorized disclosure and modification.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CP-3	CONTINGENCY TRAINING	The organization provides contingency training to information system users consistent with assigned roles and responsibilities: a. Within [Assignment: organization-defined time period] of assuming a contingency role or responsibility; b. When required by information system changes; and c. [Assignment: organization-defined frequency] thereafter.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CP-4	CONTINGENCY PLAN TESTING	The organization: a. Tests the contingency plan for the information system [Assignment: organization-defined frequency] using [Assignment: organization-defined tests] to determine the effectiveness of the plan and the organizational readiness to execute the plan; b. Reviews the contingency plan test results; and c. Initiates corrective actions, if needed.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CP-9	INFORMATION SYSTEM BACKUP	The organization: a. Conducts backups of user-level information contained in the information system [Assignment: organization-defined frequency consistent with recovery time and recovery point objectives]; b. Conducts backups of system-level information contained in the information system [Assignment: organization-defined frequency consistent with recovery time and recovery point objectives]; c. Conducts backups of information system documentation including security-related documentation [Assignment: organization-defined frequency consistent with recovery time and recovery point objectives]; and d. Protects the confidentiality, integrity, and availability of backup information at storage locations.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CP-10	INFORMATION SYSTEM RECOVERY AND RECONSTITUTION	The organization provides for the recovery and reconstitution of the information system to a known state after a disruption, compromise, or failure.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
CP-12	SAFE MODE	The information system, when [Assignment:organization-defined conditions] are detected, enters a safe mode of operation with [Assignment: organization-defined restrictions of safe mode of operation].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IA-1	IDENTIFICATION AND AUTHENTICATION POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. An identification and authentication policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the identification and authentication policy and associated identification and authentication controls; and b. Reviews and updates the current: 1. Identification and authentication policy [Assignment: organization-defined frequency]; and 2. Identification and authentication procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IA-2	IDENTIFICATION AND AUTHENTICATION (ORGANIZATIONAL USERS)	The information system uniquely identifies and authenticates organizational users (or processes acting on behalf of organizational users).	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IA-2(1)	IDENTIFICATION AND AUTHENTICATION | NETWORK ACCESS TO PRIVILEGED ACCOUNTS	The information system implements multifactor authentication for network access to privileged accounts.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IA-2(12)	IDENTIFICATION AND AUTHENTICATION | ACCEPTANCE OF PIV CREDENTIALS	The information system accepts and electronically verifies Personal Identity Verification (PIV) credentials.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IA-3	DEVICE IDENTIFICATION AND AUTHENTICATION	The information system uniquely identifies and authenticates [Assignment: organization defined specific and/or types of devices] before establishing a [Selection (one or more): local; remote; network] connection.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IA-4	IDENTIFIER MANAGEMENT	The organization manages information system identifiers by: a. Receiving authorization from [Assignment: organization-defined personnel] to assign an individual, group, role, or device identifier; b. Selecting an identifier that identifies an individual, group, role, or device; c. Assigning the identifier to the intended individual, group, role, or device; d. Preventing reuse of identifiers for [Assignment: organization-defined time period]; and e. Disabling the identifier after [Assignment: organization-defined time period of inactivity].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
IA-5	AUTHENTICATOR MANAGEMENT	The organization manages information system authenticators by: a. Verifying, as part of the initial authenticator distribution, the identity of the individual, group, role, or device receiving the authenticator; b. Establishing initial authenticator content for authenticators defined by the organization; c. Ensuring that authenticators have sufficient strength of mechanism for their intended use; d. Establishing and implementing administrative procedures for initial authenticator distribution, for lost/compromised or damaged authenticators, and for revoking authenticators; e. Changing default content of authenticators prior to information system installation; f. Establishing minimum and maximum lifetime restrictions and reuse conditions for authenticators; g. Changing/refreshing authenticators [Assignment: organization-defined time period by authenticator type]; h. Protecting authenticator content from unauthorized disclosure and modification; i. Requiring individuals to take, and having devices implement, specific security safeguards to protect authenticators; and j. Changing authenticators for group/role accounts when membership to those accounts changes.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IA-5(1)	AUTHENTICATOR MANAGEMENT | PASSWORD-BASED AUTHENTICATION	The information system, for password-based authentication: (a) Enforces minimum password complexity of [Assignment: organization-defined requirements for case sensitivity, number of characters, mix of upper-case letters, lower-case letters, numbers, and special characters, including minimum requirements for each type]; (b) Enforces at least the following number of changed characters when new passwords are created: [Assignment: organization-defined number]; (c) Stores and transmits only cryptographically-protected passwords; (d) Enforces password minimum and maximum lifetime restrictions of [Assignment: organization-defined numbers for lifetime minimum, lifetime maximum]; (e) Prohibits password reuse for [Assignment: organization-defined number] generations; and (f) Allows the use of a temporary password for system logons with an immediate change to a permanent password.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IA-5(11)	AUTHENTICATOR MANAGEMENT | HARDWARE TOKEN-BASED AUTHENTICATION	The information system, for hardware token-based authentication, employs mechanisms that satisfy [Assignment: organization-defined token quality requirements].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IA-6	AUTHENTICATOR FEEDBACK	The information system obscures feedback of authentication information during the authentication process to protect the information from possible exploitation/use by unauthorized individuals.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IA-7	CRYPTOGRAPHIC MODULE AUTHENTICATION	The information system implements mechanisms for authentication to a cryptographic module that meet the requirements of applicable federal laws, Executive Orders, directives, policies, regulations, standards, and guidance for such authentication.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IA-8	IDENTIFICATION AND AUTHENTICATION (NON-ORGANIZATIONAL USERS)	The information system uniquely identifies and authenticates non-organizational users (or processes acting on behalf of non-organizational users).	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IA-8(1)	IDENTIFICATION AND AUTHENTICATION | ACCEPTANCE OF PIV CREDENTIALS FROM OTHER AGENCIES	The information system accepts and electronically verifies Personal Identity Verification (PIV) credentials from other federal agencies.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IA-8(2)	IDENTIFICATION AND AUTHENTICATION | ACCEPTANCE OF THIRD-PARTY CREDENTIALS	The information system accepts only FICAM-approved third-party credentials.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IA-8(3)	IDENTIFICATION AND AUTHENTICATION | USE OF FICAM-APPROVED PRODUCTS	The organization employs only FICAM-approved information system components in [Assignment: organization-defined information systems] to accept third-party credentials.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IA-8(4)	IDENTIFICATION AND AUTHENTICATION | USE OF FICAM-ISSUED PROFILES	The information system conforms to FICAM-issued profiles.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IR-1	INCIDENT RESPONSE POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. An incident response policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the incident response policy and associated incident response controls; and b. Reviews and updates the current: 1. Incident response policy [Assignment: organization-defined frequency]; and 2. Incident response procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IR-2	INCIDENT RESPONSE TRAINING	The organization provides incident response training to information system users consistent with assigned roles and responsibilities: a. Within [Assignment: organization-defined time period] of assuming an incident response role or responsibility; b. When required by information system changes; and c. [Assignment: organization-defined frequency] thereafter.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IR-4	INCIDENT HANDLING	The organization: a. Implements an incident handling capability for security incidents that includes preparation, detection and analysis, containment, eradication, and recovery; b. Coordinates incident handling activities with contingency planning activities; and c. Incorporates lessons learned from ongoing incident handling activities into incident response procedures, training, and testing/exercises, and implements the resulting changes accordingly.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IR-5	INCIDENTMONITORING	The organization tracks and documents information system security incidents.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
IR-6	INCIDENT REPORTING	The organization: a. Requires personnel to report suspected security incidents to the organizational incident response capability within [Assignment: organization-defined time-period]; and b. Reports security incident information to [Assignment: organization-defined authorities].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IR-7	INCIDENT RESPONSE ASSISTANCE	The organization provides an incident response support resource, integral to the organizational incident response capability, that offers advice and assistance to users of the information system for the handling and reporting of security incidents.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
IR-8	INCIDENT RESPONSE PLAN	The organization: a. Develops an incident response plan that: 1. Provides the organization with a roadmap for implementing its incident response capability; 2. Describes the structure and organization of the incident response capability; 3. Provides a high-level approach for how the incident response capability fits into the overall organization; 4. Meets the unique requirements of the organization, which relate to mission, size, structure, and functions; 5. Defines reportable incidents; 6. Provides metrics for measuring the incident response capability within the organization; 7. Defines the resources and management support needed to effectively maintain and mature an incident response capability; and 8. Is reviewed and approved by [Assignment: organization-defined personnel or roles]; b. Distributes copies of the incident response plan to [Assignment: organization-defined incident response personnel (identified by name and/or by role) and organizational elements]; c. Reviews the incident response plan [Assignment: organization-defined frequency]; d. Updates the incident response plan to address system/organizational changes or problems encountered during plan implementation, execution, or testing; e. Communicates incident response plan changes to [Assignment: organization-defined incident response personnel (identified by name and/or by role) and organizational elements]; and f. Protects the incident response plan from unauthorized disclosure and modification.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
MA-1	SYSTEM MAINTENANCE POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A system maintenance policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the system maintenance policy and associated system maintenance controls; and b. Reviews and updates the current: 1. System maintenance policy [Assignment: organization-defined frequency]; and 2. System maintenance procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
MA-2	CONTROLLED MAINTENANCE	The organization: a. Schedules, performs, documents, and reviews records of, maintenance and repairs on information system components in accordance with manufacturer or vendor specifications and /or organizational requirements; b. Approves and monitors all maintenance activities, whether performed on site or remotely and whether the equipment is serviced on site or removed to another location; c. Requires that [Assignment: organization-defined personnel] explicitly approve the removal of the information system or system components from organizational facilities for off-site maintenance or repairs; d. Sanitizes equipment to remove all information from associated media prior to removal from organizational facilities for off-site maintenance or repairs; e. Checks all potentially impacted security controls to verify that the controls are still functioning properly following maintenance or repair actions; and f. Includes [Assignment: organization-defined maintenance-related information] in organizational maintenance records.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
MA-4	NONLOCAL MAINTENANCE	The organization: a. Approves and monitors nonlocal maintenance and diagnostic activities; b. Allows the use of nonlocal maintenance and diagnostic tools only as consistent with organizational policy and documented in the security plan for the information system; c. Employs strong authenticators in the establishment of nonlocal maintenance and diagnostic sessions; d. Maintains records for nonlocal maintenance and diagnostic activities; and e. Terminates session and network connections when nonlocal maintenance is completed.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
MA-5	MAINTENANCE PERSONNEL	The organization: a. Establishes a process for maintenance personnel authorization and maintains a list of authorized maintenance organizations or personnel; b. Ensures that non-escorted personnel performing maintenance on the information system have required access authorizations; and c. Designates organizational personnel with required access authorizations and technical competence to supervise the maintenance activities of personnel who do not possess the required access authorizations.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
MP-1	MEDIA PROTECTION POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A media protection policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the media protection policy and associated media protection controls; and b. Reviews and updates the current: 1. Media protection policy [Assignment: organization-defined frequency]; and 2. Media protection procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
MP-2	MEDIA ACCESS	The organization restricts access to [Assignment: organization-defined types of digital and/or non-digital media] to [Assignment: organization-defined personnel or roles].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
MP-6	MEDIA SANITIZATION	The organization: a. Sanitizes [Assignment: organization-defined information system media] prior to disposal, release out of organizational control, or release for reuse using [Assignment: organization-defined sanitization techniques and procedures] in accordance with applicable federal and organizational standards and policies; and b. Employs sanitization mechanisms with the strength and integrity commensurate with the security category or classification of the information.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
MP-7	MEDIA USE	The organization [Selection: restricts; prohibits] the use of [Assignment: organization-defined types of information system media] on [Assignment: organization-defined information systems or system components] using [Assignment: organization-defined security safeguards].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PE-1	PHYSICAL AND ENVIRONMENTAL PROTECTION POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A physical and environmental protection policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the physical and environmental protection policy and associated physical and environmental protection controls; and b. Reviews and updates the current: 1. Physical and environmental protection policy [Assignment: organization-defined frequency]; and 2. Physical and environmental protection procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PE-2	PHYSICAL ACCESS AUTHORIZATIONS	The organization: a. Develops, approves, and maintains a list of individuals with authorized access to the facility where the information system resides; b. Issues authorization credentials for facility access; c. Reviews the access list detailing authorized facility access by individuals [Assignment: organization-defined frequency]; and d. Removes individuals from the facility access list when access is no longer required.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PE-3	PHYSICAL ACCESS CONTROL	The organization: a. Enforces physical access authorizations at [Assignment: organization-defined entry/exit points to the facility where the information system resides] by; 1. Verifying individual access authorizations before granting access to the facility; and 2. Controlling ingress/egress to the facility using [Selection (one or more): [Assignment: organization-defined physical access control systems/devices]; guards]; b. Maintains physical access audit logs for [Assignment: organization-defined entry/exit points]; c. Provides [Assignment: organization-defined security safeguards] to control access to areas within the facility officially designated as publicly accessible; d. Escorts visitors and monitors visitor activity [Assignment: organization-defined circumstances requiring visitor escorts and monitoring]; e. Secures keys, combinations, and other physical access devices; f. Inventories [Assignment: organization-defined physical access devices] every [Assignment: organization-defined frequency]; and g. Changes combinations and keys [Assignment: organization-defined frequency] and/or when keys are lost, combinations are compromised, or individuals are transferred or terminated.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PE-6	MONITORING PHYSICAL ACCESS	The organization: a. Monitors physical access to the facility where the information system resides to detect and respond to physical security incidents; b. Reviews physical access logs [Assignment: organization-defined frequency] and upon occurrence of [Assignment: organization-defined events or potential indications of events]; and c. Coordinates results of reviews and investigations with the organizational incident response capability.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PE-8	VISITOR ACCESS RECORDS	The organization: a. Maintains visitor access records to the facility where the information system resides for [Assignment: organization-defined time period]; and b. Reviews visitor access records [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PE-11	EMERGENCY POWER	The organization provides a short-term uninterruptible power supply to facilitate [Selection (one or more): an orderly shutdown of the information system; transition of the information system to long-term alternate power] in the event of a primary power source loss.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PE-11(1)	EMERGENCY POWER | LONG-TERM ALTERNATE POWER SUPPLY - MINIMAL OPERATIONAL CAPABILITY	The organization provides a long-term alternate power supply for the information system that is capable of maintaining minimally required operational capability in the event of an extended loss of the primary power source.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PE-12	EMERGENCY LIGHTING	The organization employs and maintains automatic emergency lighting for the information system that activates in the event of a power outage or disruption and that covers emergency exits and evacuation routes within the facility.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PE-13	FIRE PROTECTION	The organization employs and maintains fire suppression and detection devices/systems for the information system that are supported by an independent energy source.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PE-14	TEMPERATURE AND HUMIDITY CONTROLS	The organization: a. Maintains temperature and humidity levels within the facility where the information system resides at [Assignment: organization - defined acceptable levels]; and b. Monitors temperature and humidity levels [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PE-15	WATER DAMAGE PROTECTION	The organization protects the information system from damage resulting from water leakage by providing master shutoff or isolation valves that are accessible, working properly, and known to key personnel.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PE-16	DELIVERY AND REMOVAL	The organization authorizes, monitors, and controls [Assignment: organization-defined types of information system components] entering and exiting the facility and maintains records of those items.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
PL-1	SECURITY PLANNING POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A security planning policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the security planning policy and associated security planning controls; and b. Reviews and updates the current: 1. Security planning policy [Assignment: organization-defined frequency]; and 2. Security planning procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PL-2	SYSTEM SECURITY PLAN	The organization: a. Develops a security plan for the information system that: 1. Is consistent with the organization's enterprise architecture; 2. Explicitly defines the authorization boundary for the system; 3. Describes the operational context of the information system in terms of missions and business processes; 4. Provides the security categorization of the information system including supporting rationale; 5. Describes the operational environment for the information system and relationships with or connections to other information systems; 6. Provides an overview of the security requirements for the system; 7. Identifies any relevant overlays, if applicable 8. Describes the security controls in place or planned for meeting those requirements including a rationale for the tailoring decisions; and 9. Is reviewed and approved by the authorizing official or designated representative prior to plan implementation; b. Distributes copies of the security plan and communicates subsequent changes to the plan to [Assignment: organization-defined personnel or roles]; c. Reviews the security plan for the information system [Assignment: organization-defined frequency]; d. Updates the plan to address changes to the information system/environment of operation or problems identified during plan implementation or security control assessments; and e. Protects the security plan from unauthorized disclosure and modification.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PL-2(3)	SYSTEM SECURITY PLAN | PLAN / COORDINATE WITH OTHER ORGANIZATIONAL ENTITIES	The organization plans and coordinates security-related activities affecting the information system with [Assignment: organization-defined individuals or groups] before conducting such activities in order to reduce the impact on other organizational entities.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PL-4	RULES OF BEHAVIOR	The organization: a. Establishes and makes readily available to individuals requiring access to the information system, the rules that describe their responsibilities and expected behavior with regard to information and information system usage; b. Receives a signed acknowledgment from such individuals, indicating that they have read, understand, and agree to abide by the rules of behavior, before authorizing access to information and the information system; c. Reviews and updates the rules of behavior [Assignment: organization-defined frequency]; and d. Requires individuals who have signed a previous version of the rules of behavior to read and resign when the rules of behavior are revised/updated.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PS-1	PERSONNEL SECURITY POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A personnel security policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the personnel security policy and associated personnel security controls; and b. Reviews and updates the current: 1. Personnel security policy [Assignment: organization-defined frequency]; and 2. Personnel security procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PS-2	POSITION RISK DESIGNATION	The organization: a. Assigns a risk designation to all organizational positions; b. Establishes screening criteria for individuals filling those positions; and c. Reviews and updates position risk designations [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PS-3	PERSONNEL SCREENING	The organization: a. Screens individuals prior to authorizing access to the information system; and b. Rescreens individuals according to [Assignment: organization -defined conditions requiring rescreening and, where re-screening is so indicated, the frequency of such rescreening].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PS-4	PERSONNEL TERMINATION	The organization, upon termination of individual employment: a. Disables information system access within [Assignment: organization-defined time period]; b. Terminates/revokes any authenticators/credentials associated with the individual; c. Conducts exit interviews that include a discussion of [Assignment: organization-defined information security topics]; d. Retrieves all security-related organizational information system-related property; e. Retains access to organizational information and information systems formerly controlled by terminated individual; and f. Notifies [Assignment: organization-defined personnel or roles] within [Assignment: organization-defined time period].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PS-5	PERSONNEL TRANSFER	The organization: a. Reviews and confirms ongoing operational need for current logical and physical access authorizations to information systems/facilities when individuals are reassigned or transferred to other positions within the organization; b. Initiates [Assignment: organization-defined transfer or reassignment actions] within [Assignment: organization-defined time period following the formal transfer action]; c. Modifies access authorization as needed to correspond with any changes in operational need due to reassignment or transfer; and d. Notifies [Assignment: organization-defined personnel or roles] within [Assignment: organization-defined time period].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
PS-6	ACCESS AGREEMENTS	The organization: a. Develops and documents access agreements for organizational information systems; b. Reviews and updates the access agreements [Assignment: organization-defined frequency]; and c. Ensures that individuals requiring access to organizational information and information systems: 1. Sign appropriate access agreements prior to being granted access; and 2. Re-sign access agreements to maintain access to organizational information systems when access agreements have been updated or [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PS-7	THIRD-PARTY PERSONNEL SECURITY	The organization: a. Establishes personnel security requirements including security roles and responsibilities for third-party providers; b. Requires third-party providers to comply with personnel security policies and procedures established by the organization; c. Documents personnel security requirements; d. Requires third-party providers to notify [Assignment: organization-defined personnel or roles] of any personnel transfers or terminations of third-party personnel who possess organizational credentials and/or badges, or who have information system privileges within [Assignment: organization-defined time period]; and e. Monitors provider compliance.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PS-8	PERSONNEL SANCTIONS	The organization: a. Employs a formal sanctions process for individuals failing to comply with established information security policies and procedures; and b. Notifies [Assignment: organization-defined personnel or roles] within [Assignment: organization-defined time period] when a formal employee sanctions process is initiated, identifying the individual sanctioned and the reason for the sanction.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
RA-1	RISK ASSESSMENT POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A risk assessment policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the risk assessment policy and associated risk assessment controls; and b. Reviews and updates the current: 1. Risk assessment policy [Assignment: organization-defined frequency]; and 2. Risk assessment procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
RA-2	SECURITY CATEGORIZATION	The organization: a. Categorizes information and the information system in accordance with applicable federal laws, Executive Orders, directives, policies, regulations, standards, and guidance; b. Documents the security categorization results (including supporting rationale) in the security plan for the information system; and c. Ensures that the security categorization decision is reviewed and approved by the authorizing official or authorizing official designated representative.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
RA-3	RISK ASSESSMENT	The organization: a. Conducts an assessment of risk, including the likelihood and magnitude of harm, from the unauthorized access, use, disclosure, disruption, modification, or destruction of the information system and the information it processes, stores, or transmits; b. Documents risk assessment results in [Selection: security plan; risk assessment report; [Assignment: organization-defined document]]; c. Reviews risk assessment results [Assignment: organization-defined frequency]; d. Disseminates risk assessment results to [Assignment: organization-defined personnel or roles]; and e. Updates the risk assessment [Assignment: organization-defined frequency] or whenever there are significant changes to the information system or environment of operation (including the identification of new threats and vulnerabilities), or other conditions that may impact the security state of the system.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
RA-5	VULNERABILITY SCANNING	The organization: a. Scans for vulnerabilities in the information system and hosted applications [Assignment: organization-defined frequency and/or randomly in accordance with organization-defined process] and when new vulnerabilities potentially affecting the system/applications are identified and reported; b. Employs vulnerability scanning tools and techniques that facilitate interoperability among tools and automate parts of the vulnerability management process by using standards for: 1. Enumerating platforms, software flaws, and improper configurations; 2. Formatting checklists and test procedures; and 3. Measuring vulnerability impact; c. Analyzes vulnerability scan reports and results from security control assessments; d. Remediates legitimate vulnerabilities [Assignment: organization-defined response times] in accordance with an organizational assessment of risk; and e. Shares information obtained from the vulnerability scanning process and security control assessments with [Assignment: organization-defined personnel or roles] to help eliminate similar vulnerabilities in other information systems (i.e., systemic weaknesses or deficiencies).	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SA-1	SYSTEM AND SERVICES ACQUISITION POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A system and services acquisition policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the system and services acquisition policy and associated system and services acquisition controls; and b. Reviews and updates the current: 1. System and services acquisition policy [Assignment: organization-defined frequency]; and 2. System and services acquisition procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
SA-2	ALLOCATION OF RESOURCES	The organization: a. Determines information security requirements for the information system or information system service in mission/business process planning; b. Determines, documents, and allocates the resources required to protect the information system or information system service as part of its capital planning and investment control process; and c. Establishes a discrete line item for information security in organizational programming and budgeting documentation	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SA-3	SYSTEM DEVELOPMENT LIFE CYCLE	The organization: a. Manages the information system using [Assignment: organization-defined system development life cycle] that incorporates information security considerations; b. Defines and documents information security roles and responsibilities throughout the system development life cycle; c. Identifies individuals having information security roles and responsibilities; and d. Integrates the organizational information security risk management process into system development life cycle activities.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SA-4	ACQUISITION PROCESS	The organization includes the following requirements, descriptions, and criteria, explicitly or by reference, in the acquisition contract for the information system, system component, or information system service in accordance with applicable federal laws, Executive Orders, directives, policies, regulations, standards, guidelines, and organizational mission/business needs: a. Security functional requirements; b. Security strength requirements; c. Security assurance requirements; d. Security-related documentation requirements; e. Requirements for protecting security-related documentation; f. Description of the information system development environment and environment in which the system is intended to operate; and g. Acceptance criteria.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SA-4(10)	ACQUISITION PROCESS | USE OF APPROVED PIV PRODUCTS	The organization employs only information technology products on the FIPS 201-approved products list for Personal Identity Verification (PIV) capability implemented within organizational information systems.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SA-5	INFORMATION SYSTEM DOCUMENTATION	The organization: a. Obtains administrator documentation for the information system, system component, or information system service that describes: 1. Secure configuration, installation, and operation of the system, component, or service; 2. Effective use and maintenance of security functions/mechanisms; and 3. Known vulnerabilities regarding configuration and use of administrative (i.e., privileged) functions; b. Obtains user documentation for the information system, system component, or information system service that describes: 1. User-accessible security functions/mechanisms and how to effectively use those security functions/mechanisms; 2. Methods for user interaction, which enables individuals to use the system, component, or service in a more secure manner; and 3. User responsibilities in maintaining the security of the system, component, or service; c. Documents attempts to obtain information system, system component, or information system service documentation when such documentation is either unavailable or nonexistent and [Assignment: organization-defined actions] in response; d. Protects documentation as required, in accordance with the risk management strategy; and e. Distributes documentation to [Assignment: organization-defined personnel or roles].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SA-9	EXTERNAL INFORMATION SYSTEM SERVICES	The organization: a. Requires that providers of external information system services comply with organizational information security requirements and employ [Assignment: organization-defined security controls] in accordance with applicable federal laws, Executive Orders, directives, policies, regulations, standards, and guidance; b. Defines and documents government oversight and user roles and responsibilities with regard to external information system services; and c. Employs [Assignment: organization-defined processes, methods, and techniques] to monitor security control compliance by external service providers on an ongoing basis.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SC-1	SYSTEM AND COMMUNICATIONS PROTECTION POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A system and communications protection policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the system and communications protection policy and associated system and communications protection controls; and b. Reviews and updates the current: 1. System and communications protection policy [Assignment: organization-defined frequency]; and 2. System and communications protection procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SC-5	DENIAL OF SERVICE PROTECTION	The information system protects against or limits the effects of the following types of denial of service attacks: [Assignment: organization-defined types of denial of service attacks or reference to source for such information] by employing [Assignment: organization-defined security safeguards].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SC-7	BOUNDARY PROTECTION	The information system: a. Monitors and controls communications at the external boundary of the system and at key internal boundaries within the system; b. Implements subnetworks for publicly accessible system components that are [Selection: physically; logically] separated from internal organizational networks; and c. Connects to external networks or information systems only through managed interfaces consisting of boundary protection devices arranged in accordance with an organizational security architecture.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SC-12	CRYPTOGRAPHIC KEY ESTABLISHMENT AND MANAGEMENT	The organization establishes and manages cryptographic keys for required cryptography employed within the information system in accordance with [Assignment: organization-defined requirements for key generation, distribution, storage, access, and destruction].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
SC-13	CRYPTOGRAPHIC PROTECTION	The information system implements [Assignment: organization-defined cryptographic uses and type of cryptography required for each use] in accordance with applicable federal laws, Executive Orders, directives, policies, regulations, and standards.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SC-15	COLLABORATIVE COMPUTING DEVICES	The information system: a. Prohibits remote activation of collaborative computing devices with the following exceptions: [Assignment: organization-defined exceptions where remote activation is to be allowed]; and b. Provides an explicit indication of use to users physically present at the devices.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SC-20	SECURE NAME / ADDRESS RESOLUTION SERVICE (AUTHORITATIVE SOURCE)	The information system: a. Provides additional data origin authentication and integrity verification artifacts along with the authoritative name resolution data the system returns in response to external name/address resolution queries; and b. Provides the means to indicate the security status of child zones and (if the child supports secure resolution services) to enable verification of a chain of trust among parent and child domains, when operating as part of a distributed, hierarchical namespace.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SC-21	SECURE NAME / ADDRESS RESOLUTION SERVICE (RECURSIVE OR CACHING RESOLVER)	The information system requests and performs data origin authentication and data integrity verification on the name/address resolution responses the system receives from authoritative sources.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SC-22	ARCHITECTURE AND PROVISIONING FOR NAME / ADDRESS RESOLUTION SERVICE	The information systems that collectively provide name/address resolution service for an organization are fault-tolerant and implement internal/external role separation.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SC-39	PROCESS ISOLATION	The information system maintains a separate execution domain for each executing process.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SC-41	PORT AND I/O DEVICE ACCESS	The organization physically disables or removes [Assignment: organization-defined connection ports or input/output devices] on [Assignment: organization-defined information systems or information system components].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SI-1	SYSTEM AND INFORMATION INTEGRITY POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A system and information integrity policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the system and information integrity policy and associated system and information integrity controls; and b. Reviews and updates the current: 1. System and information integrity policy [Assignment: organization-defined frequency]; and 2. System and information integrity procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SI-2	FLAW REMEDIATION	The organization: a. Identifies, reports, and corrects information system flaws; b. Tests software and firmware updates related to flaw remediation for effectiveness and potential side effects before installation; c. Installs security-relevant software and firmware updates within [Assignment: organization-defined time period] of the release of the updates; and d. Incorporates flaw remediation into the organizational configuration management process.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SI-3	MALICIOUS CODE PROTECTION	The organization: a. Employs malicious code protection mechanisms at information system entry and exit points to detect and eradicate malicious code; b. Updates malicious code protection mechanisms whenever new releases are available in accordance with organizational configuration management policy and procedures; c. Configures malicious code protection mechanisms to: 1. Perform periodic scans of the information system [Assignment: organization-defined frequency] and real-time scans of files from external sources at [Selection (one or more); endpoint; network entry/exit points] as the files are downloaded, opened, or executed in accordance with organizational security policy; and 2. [Selection (one or more): block malicious code; quarantine malicious code; send alert to administrator; [Assignment: organization-defined action]] in response to malicious code detection; and d. Addresses the receipt of false positives during malicious code detection and eradication and the resulting potential impact on the availability of the information system.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SI-4	INFORMATION SYSTEM MONITORING	The organization: a. Monitors the information system to detect: 1. Attacks and indicators of potential attacks in accordance with [Assignment: organization-defined monitoring objectives]; and 2. Unauthorized local, network, and remote connections; b. Identifies unauthorized use of the information system through [Assignment: organization-defined techniques and methods]; c. Deploys monitoring devices: (i) strategically within the information system to collect organization-determined essential information; and (ii) at ad hoc locations within the system to track specific types of transactions of interest to the organization; d. Protects information obtained from intrusion-monitoring tools from unauthorized access, modification, and deletion; e. Heightens the level of information system monitoring activity whenever there is an indication of increased risk to organizational operations and assets, individuals, other organizations, or the Nation based on law enforcement information, intelligence information, or other credible sources of information; f. Obtains legal opinion with regard to information system monitoring activities in accordance with applicable federal laws, Executive Orders, directives, policies, or regulations; and g. Provides [Assignment: organization-defined information system monitoring information] to [Assignment: organization-defined personnel or roles] [Selection (one or more): as needed; [Assignment: organization-defined frequency]].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
SI-5	SECURITY ALERTS, ADVISORIES, AND DIRECTIVES	The organization: a. Receives information system security alerts, advisories, and directives from [Assignment: organization-defined external organizations] on an ongoing basis; b. Generates internal security alerts, advisories, and directives as deemed necessary; c. Disseminates security alerts, advisories, and directives to: [Selection (one or more): [Assignment: organization-defined personnel (identified by name and/or by role)]; [Assignment: organization-defined elements within the organization]; [Assignment: organization-defined external organizations]]; and d. Implements security directives in accordance with established time frames, or notifies the issuing organization of the degree of noncompliance.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SI-12	INFORMATION HANDLING AND RETENTION	The organization handles and retains information within the information system and information output from the system in accordance with applicable federal laws, Executive Orders, directives, policies, regulations, standards, and operational requirements.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
SI-17	FAIL-SAFE PROCEDURES	The information system implements [Assignment: organization-defined fail-safe procedures] when [Assignment: organization-defined failure conditions occur].	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PM-1	INFORMATION SECURITY PROGRAM PLAN	The organization: a. Develops and disseminates an organization-wide information security program plan that: 1. Provides an overview of the requirements for the security program and a description of the security program management controls and common controls in place or planned for meeting those requirements; 2. Includes the identification and assignment of roles, responsibilities, management commitment, coordination among organizational entities, and compliance; 3. Reflects coordination among organizational entities responsible for the different aspects of information security (i.e., technical, physical, personnel, cyber-physical); and 4. Is approved by a senior official with responsibility and accountability for the risk being incurred to organizational operations (including mission, functions, image, and reputation), organizational assets, individuals, other organizations, and the Nation; b. Reviews the organization-wide information security program plan [Assignment: organization-defined frequency]; c. Updates the plan to address organizational changes and problems identified during plan implementation or security control assessments; and d. Protects the information security program plan from unauthorized disclosure and modification.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PM-2	SENIOR INFORMATION SECURITY OFFICER	The organization appoints a senior information security officer with the mission and resources to coordinate, develop, implement, and maintain an organization-wide information security program.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PM-3	INFORMATION SECURITY RESOURCES	The organization: a. Ensures that all capital planning and investment requests include the resources needed to implement the information security program and documents all exceptions to this requirement; b. Employs a business case/Exhibit 300/Exhibit 53 to record the resources required; and c. Ensures that information security resources are available for expenditure as planned.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PM-4	PLAN OF ACTION AND MILESTONES PROCESS	The organization: a. Implements a process for ensuring that plans of action and milestones for the security program and associated organizational information systems: 1. Are developed and maintained; 2. Document the remedial information security actions to adequately respond to risk to organizational operations and assets, individuals, other organizations, and the Nation; and 3. Are reported in accordance with OMB FISMA reporting requirements. b. Reviews plans of action and milestones for consistency with the organizational risk management strategy and organization-wide priorities for risk response actions.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PM-5	INFORMATION SYSTEM INVENTORY	The organization develops and maintains an inventory of its information systems.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PM-6	INFORMATION SECURITY MEASURES OF PERFORMANCE	The organization develops, monitors, and reports on the results of information security measures of performance.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PM-7	ENTERPRISE ARCHITECTURE	The organization develops an enterprise architecture with consideration for information security and the resulting risk to organizational operations, organizational assets, individuals, other organizations, and the Nation.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PM-8	CRITICAL INFRASTRUCTURE PLAN	The organization addresses information security issues in the development, documentation, and updating of a critical infrastructure and key resources protection plan.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PM-9	RISK MANAGEMENT STRATEGY	The organization: a. Develops a comprehensive strategy to manage risk to organizational operations and assets, individuals, other organizations, and the Nation associated with the operation and use of information systems; b. Implements the risk management strategy consistently across the organization; and c. Reviews and updates the risk management strategy [Assignment: organization-defined frequency] or as required, to address organizational changes.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PM-10	SECURITY AUTHORIZATION PROCESS	The organization: a. Manages (i.e., documents, tracks, and reports) the security state of organizational information systems and the environments in which those systems operate through security authorization processes; b. Designates individuals to fulfill specific roles and responsibilities within the organizational risk management process; and c. Fully integrates the security authorization processes into an organization-wide risk management program.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PM-11	MISSION/BUSINESS PROCESS DEFINITION	The organization: a. Defines mission/business processes with consideration for information security and the resulting risk to organizational operations, organizational assets, individuals, other organizations, and the Nation; and b. Determines information protection needs arising from the defined mission/business processes and revises the processes as necessary, until achievable protection needs are obtained.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
PM-12	INSIDER THREAT PROGRAM	The organization implements an insider threat program that includes a cross-discipline insider threat incident handling team.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PM-13	INFORMATION SECURITY WORKFORCE	The organization establishes an information security workforce development and improvement program.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PM-14	TESTING, TRAINING, AND MONITORING	The organization: a. Implements a process for ensuring that organizational plans for conducting security testing, training, and monitoring activities associated with organizational information systems: 1. Are developed and maintained; and 2. Continue to be executed in a timely manner; b. Reviews testing, training, and monitoring plans for consistency with the organizational risk management strategy and organization-wide priorities for risk response actions.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PM-15	CONTACTS WITH SECURITY GROUPS AND ASSOCIATIONS	The organization establishes and institutionalizes contact with selected groups and associations within the security community: a. To facilitate ongoing security education and training for organizational personnel; b. To maintain currency with recommended security practices, techniques, and technologies; and c. To share current security-related information including threats, vulnerabilities, and incidents.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.
PM-16	THREAT AWARENESS PROGRAM	The organization implements a threat awareness program that includes a cross-organization information-sharing capability.	Generated	Generated for LOW-LOW-LOW impact levels using DoD CCI generator.

Control Correlation Identifiers (CCI) List

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-000043	AC-7(a)	The organization defines the maximum number of consecutive invalid logon attempts to the information system by a user during an organization-defined time period.	DoD-Defined Designer Impractical	Unsuccessful Logon Attempts	Except for high availability user interfaces indicated as exempt, devices must meet the indicated requirements (3) for handling unsuccessful logon attempts. If a device cannot meet these requirements, document device capabilities to protect from subsequent logon attempts and propose alternate protections in a Device Account Lock Exception Request submittal. Do not implement alternate protection measures in lieu of the indicated requirements without explicit permission from the Government.
CCI-000044	AC-7(a)	The information system enforces the organization-defined limit of consecutive invalid logon attempts by a user during the organization-defined time period.	Designer	Unsuccessful Logon Attempts	Except for high availability user interfaces indicated as exempt, devices must meet the indicated requirements (3) for handling unsuccessful logon attempts. If a device cannot meet these requirements, document device capabilities to protect from subsequent logon attempts and propose alternate protections in a Device Account Lock Exception Request submittal. Do not implement alternate protection measures in lieu of the indicated requirements without explicit permission from the Government.
CCI-000048	AC-8(a)	The information system displays an organization-defined system use notification message or banner before granting access to the system that provides privacy and security notices consistent with applicable federal laws, Executive Orders, directives, policies, regulations, standards, and guidance.	Enclave Designer Impractical	System Use Notification	For networked devices with Remote User Interfaces which are capable, Contractor is required to configure the device to display a warning banner meeting the requirements of DTM 08-060 on screen. For Devices which are connected to a network and have a local user interface Contractor must ensure these display a warning banner meeting the requirements of DTM 08-060 on the user interface screen if capable of doing so and must have a permanently affixed label with an approved banner from DTM 08-060 if unable to display the warning banner on the screen. Where it is impractical (perhaps due to device size) to affix the label to the device, affix the label to the device enclosure.Labels must be machine printed or engraved, plastic or metal, designed for permanent installation, must use a font no smaller than 14 point, and must provide a high contrast between font and background colors All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06).
CCI-000050	AC-8(b)	The information system retains the notification message or banner on the screen until users acknowledge the usage conditions and take explicit actions to log on to or further access.	Enclave Designer	System Use Notification	See CCI-000048
CCI-000061	AC-14(a)	The organization identifies and defines organization-defined user actions that can be performed on the information system without identification or authentication consistent with organizational missions/business functions.	Designer	Permitted Actions Without Identification or Authentication	This is met by requiring the contractor to ensure that control system must require identification and authentication before allowing any actions except read-only actions by a user acting from a user interface which MINIMALLY or FULLY supports accounts.
CCI-000123	AU-2(a)	The organization determines the information system must be capable of auditing an organization-defined list of auditable events.	Designer Non-Designer	Audit Events, Content of Audit Records, and Audit Generation;	For each controller which does not FULLY support accounts configure the controller to audit all controller shutdown and startup events and to record for each event the type of event and when the event occurred where the device is capable to do so. For all other controllers, there are no requirements to perform auditing at these field controllers that do not FULLY support accounts and are not capable of meeting these requirements.
CCI-000125	AU-2(c)	The organization provides a rationale for why the list of auditable events is deemed to be adequate to support after-the-fact investigations of security incidents.	Designer Non-Designer	Audit Events, Content of Audit Records, and Audit Generation;	This is met by requiring the contractor to configure all ES Controllers which FULLY Support Accounts to audit what type of event occurred, when the event occurred, where the event occurred, the source of the event, the outcome of the event, the identity of any individuals or subjects associated with the event, as applicable and as the controller is capable.
CCI-000130	AU-3	The information system generates audit records containing information that establishes what type of event occurred.	Designer	Audit Events, Content of Audit Records, and Audit Generation;	For those controllers capable of performing auditing, this is met by requiring the contractor to configure the controller to generate audit records containing information that establishes what type of event occurred. Contractor to determine and apply all STIGs/SRGs.
CCI-000131	AU-3	The information system generates audit records containing information that establishes when an event occurred.	Designer	Audit Events, Content of Audit Records, and Audit Generation	For those controllers capable of performing auditing, this is met by requiring the contractor to configure the controller to g audit records containing information that establishes when an event occurred. Contractor to determine and apply all STIGs/SRGs.
CCI-000132	AU-3	The information system generates audit records containing information that establishes where the event occurred.	Designer	Audit Events, Content of Audit Records, and Audit Generation	For those controllers capable of performing auditing, this is met by requiring the contractor to configure the controller to generate audit records containing information that establishes where the event occurred. Contractor to determine and apply all STIGs/SRGs.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-000133	AU-3	The information system generates audit records containing information that establishes the source of the event.	Designer	Audit Events, Content of Audit Records, and Audit Generation	For those controllers capable of performing auditing, this is met by requiring the contractor to configure the controller to generate audit records containing information that establishes the source of the event. Contractor to determine and apply all STIGs/SRGs.
CCI-000134	AU-3	The information system generates audit records containing information that establishes the outcome of the event.	Designer	Audit Events, Content of Audit Records, and Audit Generation	For those controllers capable of performing auditing, this is met by requiring the contractor to configure the conroller to generate audit records containing information that establishes the outcome of the event. Contractor to determine and apply all STIGs/SRGs.
CCI-000159	AU-8(a)	The information system uses internal system clocks to generate time stamps for audit records.	Designer	Audit Time Stamps	This is partially met by requiring the contractor to ensure that any device, (controller) generating audit records must have an internal clock capable of providing time with a resolution of one second. Contractor to ensure clocks must not drift more than 10 seconds per day. Contractor must configure the system so that each device (controller) generating audit records maintains accurate time to within 1 second. Contractor is to ensure that if the control system specifications include requirement for clocks, the most stringent requirement applies. Contractor is responsible to determine and apply all applicable STIGs and SRGs. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06).
CCI-000169	AU-12(a)	The information system provides audit record generation capability for the auditable events defined in AU-2 a at organization defined information system components.	Designer	Audit Events, Content of Audit Records, and Audit Generation	This is partially met by requiring the contractor to ensure that controllers will be configured to record, Successful and unsuccessful logon attempts to the controller; Successful logouts; All account creations, modifications, disabling, and terminations; All controller shutdown and startup. Contractor is required to provide step-by-step documentation for this process as a part of the control systems final CYBERSECURITY DOCUMENTATION submittal. If the controller does not support this capability, the Contractor is to provide a statement documenting this deficiency as a part of the final Control System Cybersecurity Documentation. Contractor is required to determine and apply all applicable STIGs/SRGs.
CCI-000171	AU-12(b)	The information system allows organization-defined personnel or roles to select which auditable events are to be audited by specific components of the information system.	Designer Impractical	Audit Events, Content of Audit Records, and Audit Generation	This is partially met by requiring the contractor to ensure that controllers will be configured to record, Successful and unsuccessful logon attempts to the controller; Successful logouts; All account creations, modifications, disabling, and terminations; All controller shutdown and startup. Contractor is required to provide step-by-step documentation for this process as a part of the control systems final CYBERSECURITY DOCUMENTATION submittal. If the controller does not support this capability, the Contractor is to provide a statement documenting this deficiency as a part of the final Control System Cybersecurity Documentation. Contractor is required to determine and apply all applicable STIGs/SRGs.
CCI-000172	AU-12(c)	The information system generates audit records for the events defined in AU-2 d with the content defined in AU-3.	Designer	Audit Events, Content of Audit Records, and Audit Generation	This is partially met by requiring the contractor to configure ontrollers to generate audit records for the defined subset of the auditable events defined in AU-2, CCI-000126, which are listed the events listed in AU-2 (a), CCI-000123 per occurrence as required by DoD, which will contain information that establishes the outcome of the event as defined by AU-3, CCI-000134. Contractor is required to determine and apply all applicable STIGs/SRGs applicable STIGs or SRGs that pertains to CCI-000172. For controllers with the capability to store audit records, contractor to configure the generating and storing audit records locally in its internal memory for these records to be retrieved and reviewed during routine maintenance or inspection by the ISSM or individual appointed by the ISSM upon final acceptance of the control system. Contractor to provide step-by-step documentation for this process as a part of the control systems final CYBERSECURITY DOCUMENTATION submittal.
CCI-000176	IA-5(b)	The organization manages information system authenticators by establishing initial authenticator content for authenticators defined by the organization.	Designer Non-Designer	---	The organization is responsible for managing control system authenticators by establishing initial authenticator content for authenticators defined by the organization.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-000182	IA-5(g)	The organization manages information system authenticators by changing/refreshing authenticators in accordance with the organization defined time period by authenticator type.	DoD-Defined Designer Non-Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	This CCI requires infrastructure support and is therefore impractical. Implementation of this CCI is modified to require the contractor to ensure all devices and software must not use cached authenticators. For all non-computing components, (e.g., PLC's, RTU's, and Human Machine Interface (HMI)'s) that cannot meet the password requirements, contractor is required to use the strongest password that is technically feasible as long as this does not interfere with the full functionality of the control system component and the control system it supports, as designed. Upon final acceptance of the control system, the organization is responsible for changing Passwords for any User Interfaces provided by, or connected to, an existing computer operating systems according to the DOD specified time of every 60 days.
CCI-000192	IA-5(1)(a)	The information system enforces password complexity by the minimum number of upper case characters used.	Enclave Designer	USER IDENTIFICATION AND AUTHENTICATION	This is partially met by requiring the contractor to configure any any devices (controllers) FULLY supporting accounts and supporting password-based authentication, and Passwords for Remote Interfaces to contain at least one uppercase character. Contractor is required to determine and apply all applicable STIGs/SRGs. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06)
CCI-000193	IA-5(1)(a)	The information system enforces password complexity by the minimum number of lower case characters used.	Enclave Designer	USER IDENTIFICATION AND AUTHENTICATION	This is partially met by requiring the contractor to configure any any devices (controllers) FULLY supporting accounts and supporting password-based authentication, and Passwords for Remote Interfaces to contain at least one lowercase character. Contractor is required to determine and apply all applicable STIGs/SRGs. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06)
CCI-000194	IA-5(1)(a)	The information system enforces password complexity by the minimum number of numeric characters used.	Enclave Designer	USER IDENTIFICATION AND AUTHENTICATION	This is partially met by requiring the contractor to configure any any devices (controllers) FULLY supporting accounts and supporting password-based authentication, and Passwords for Remote Interfaces to contain at least one numeric character. Contractor is required to determine and apply all applicable STIGs/SRGs. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06)
CCI-000195	IA-5(1)(b)	The information system, for password-based authentication, when new passwords are created, enforces that at least an organization-defined number of characters are changed.	Enclave Designer	USER IDENTIFICATION AND AUTHENTICATION	This is partially met by requiring the contractor to configure any any devices (controllers) FULLY supporting accounts and supporting password-based authentication, and Passwords for Remote Interfaces to ensure all password must differ from previous five (5) passwords, where differ is defined as changing at least fifty percent of the characters. Contractor is required to determine and apply all applicable STIGs/SRGs. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06)
CCI-000196	IA-5(1)(c)	The information system, for password-based authentication, stores only cryptographically-protected passwords.	Enclave Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	This is partially met by requiring the contractor to configure any any devices (controllers) FULLY supporting accounts and supporting password-based authentication, and Passwords for Remote Interfaces to ensure must be cryptographically protected during storage and transmission. Contractor is required to determine and apply all applicable STIGs/SRGs. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06)
CCI-000197	IA-5(1)(c)	The information system, for password-based authentication, transmits only cryptographically-protected passwords.	Enclave Designer	USER IDENTIFICATION AND AUTHENTICATION	This is partially met by requiring the contractor to configure any any devices (controllers) FULLY supporting accounts and supporting password-based authentication, and Passwords for Remote Interfaces to ensure must be cryptographically protected during storage and transmission. Contractor is required to determine and apply all applicable STIGs/SRGs. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06)

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-000198	IA-5(1)(d)	The information system enforces minimum password lifetime restrictions.	Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	Not applicable at the controller; This is managed at PIT L2 computer or above which allows for minimum lifetime of 24 hours which allows the use of a temporary password for system logons with an immediate change to a permanent password.)
CCI-000199	IA-5(1)(d)	The information system enforces maximum password lifetime restrictions.	Enclave Designer	USER IDENTIFICATION AND AUTHENTICATION	This is partially met by requiring the contractor to configure all controllers FULLY supporting user accounts, to ensure that passwords must have a maximum lifetime of 60 days. Contractor to configure the computer or controller to prompt users to change passwords. Contractor to ensure accounts do not lock due to expired passwords. Contractor is required to determine and apply all applicable STIGs/SRGs. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06)
CCI-000200	IA-5(1)(e)	The information system prohibits password reuse for the organization defined number of generations.	Enclave Designer Non-Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	This is partially met by requiring the contractor to configure all controllers FULLY supporting user accounts, to ensure that passwords must have a maximum lifetime of 60 days. Contractor to configure the computer or controller to prompt users to change passwords. Contractor to ensure accounts do not lock due to expired passwords. Contractor is required to determine and apply all applicable STIGs/SRGs. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06)
CCI-000205	IA-5(1)(a)	The information system enforces minimum password length.	Enclave Designer	USER IDENTIFICATION AND AUTHENTICATION	Unless otherwise indicated, all user interfaces supporting accounts (either FULLY or MINIMALLY) must implement Identification and Authorization via passwords. For all non-computing components, (e.g., PLC's, RTU's, and Human Machine Interface (HMI)'s) that cannot meet the password requirements, use the strongest password that is technically feasible as long as this does not interfere with the full functionality of the control system component and the control system it supports, as designed. All devices and software must not use cached authenticators. The organization is responsible to ensure all policies and user training including advising users not to use the same password for domains of differing classification levels.
CCI-000206	IA-6	The information system obscures feedback of authentication information during the authentication process to protect the information from possible exploitation/use by unauthorized individuals.	Enclave Designer Impractical	Authenticator Feedback	This is addressed by requiring the contractor to employ devices that do not show authentication information on a display. Devices that momentarily display a character as it is entered are acceptable. For devices that have STIGs or SRGs related to CCI-000206 will comply with those requirements.
CCI-000207	PM-5	The organization develops and maintains an inventory of its information systems.	Designer Non-Designer Impractical	Control System Inventory Report	This is met requiring the contractor to complete a Control System Inventory report using the most current Inventory Spreadsheet listed at the www.wbdg.org documenting all devices, including networked devices, network infrastructure devices, non-networked devices, input devices (e.g. sensors) and output devices (e.g. actuators) that includes all components withing the authorization boundary of the system. Contractor is required that for each device, they must provide all applicable information for which there is a field on the spreadsheet in accordance with the instructions on the spreadsheet.
CCI-000232	AC-14(b)	The organization documents and provides supporting rationale in the security plan for the information system, user actions not requiring identification and authentication.	Designer	Permitted Actions Without Identification or Authentication	See CCI-000061
CCI-000236	PM-11(b)	The organization determines information protection needs arising from the defined mission/business processes and revises the processes as necessary, until an achievable set of protection needs are obtained.	Enclave Designer Non-Designer	Control System Cybersecurity Documentation	This is partially met by implementation of the Cybersecurity Design Process as required by UFC 4-010-06. The organization is responsible to determine any information protection needs arising from the defined mission/business processes and partner with the Cybersecurity Designer to revise the processes as necessary, until an achievable set of protection needs are obtained Designer during the Five Steps for Cybersecurity Design as per Section 3-1.1, and then revised during this processes as necessary, until the completion of the Design Review by the Government at the 35% Design Deliverable for the identified Control System(s). The contractor will then will be required to provide baseline Control System Cybersecurity Documentation at project end for all Control System, subsystems, and devices. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06).

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-000258	CA-3(b)	The organization documents, for each interconnection, the interface characteristics.	Enclave Designer Non-Designer	Cybersecurity Interconnection Schedule; CYBERSECURITY DURING CONSTRUCTION	Requiring the contractor to meet CYBERSECURITY DURING CONSTRUCTION requirements as listed in this section of the UFGS 25 05 11.XX. The Contractor is also required to provide a completed Cybersecurity Interconnection Schedule documenting network connections between the installed system and other systems including information for each device directly communicating between systems: Device Identifier, Device Description, Transport layer Protocol, Network Address, Port (if applicable), MAC (Layer 2) address (if applicable), Media, Application Protocol, Service (if applicable), Descriptive Purpose of communication. The organization is responsible to document any Interconnection security agreements which are required for systems connecting between enclaves which can include both DoD enclaves or non DoD enclaves. The Contractor is also required to ensure all Ethernet switches are provided and configured as listed in the UFGS Section ETHERNET SWITCH. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06).
CCI-000293	CM-2	The organization develops and documents a current baseline configuration of the information system.	Designer	---	This is met by requiring the Contractor to provide all baseline Control System Cybersecurity Documentation at project end for all Control System, subsystems, and devices. The Government organization is responsble to continue to develop and document current baseline configuration of the control system, subsystem and devices throughout the lifecycle of the control system.
CCI-000363	CM-6(a)	The organization defines security configuration checklists to be used to establish and document configuration settings for the information system technology products employed.	Designer	REQUIREMENTS FOR LEAST FUNCTIONALITY	This is met by requiring the Contractor to ensure that IP Networks must be Ethernet networks and must use switches which are Ethernet Switches as defined in this Section. Contractor must not use nonsecure functions, ports, protocols and services as defined in DODI 8551.01 unless those ports, protocols and services are specifically required by the control system specifications or otherwise specifically authorized by the Government. Contractor must not use, and/or must physically disable or remove ports, protocols and services that are not specified in the control system specifications or required for operation of the control system. For devices that have a STIG or SRG related to Requirements for Least Functionality (such as configuration settings and port and device I/O access for least functionality), Contractor is required to install and configure the device in accordance with that STIG or SRGs.
CCI-000364	CM-6(a)	The organization establishes configuration settings for information technology products employed within the information system using organization-defined security configuration checklists.	Designer	REQUIREMENTS FOR LEAST FUNCTIONALITY	This is met by requiring the Contractor to ensure that IP Networks must be Ethernet networks and must use switches which are Ethernet Switches as defined in this Section. Contractor must not use nonsecure functions, ports, protocols and services as defined in DODI 8551.01 unless those ports, protocols and services are specifically required by the control system specifications or otherwise specifically authorized by the Government. Contractor must not use, and/or must physically disable or remove ports, protocols and services that are not specified in the control system specifications or required for operation of the control system. For devices that have a STIG or SRG related to Requirements for Least Functionality (such as configuration settings and port and device I/O access for least functionality), Contractor is required to install and configure the device in accordance with that STIG or SRGs.
CCI-000365	CM-6(a)	The organization documents configuration settings for information technology products employed within the information system using organization-defined security configuration checklists that reflect the most restrictive mode consistent with operational requirements.	DoD-Defined Designer Non-Designer Impractical	REQUIREMENTS FOR LEAST FUNCTIONALITY	This is met by requiring the Contractor to ensure that IP Networks must be Ethernet networks and must use switches which are Ethernet Switches as defined in this Section. Contractor must not use nonsecure functions, ports, protocols and services as defined in DODI 8551.01 unless those ports, protocols and services are specifically required by the control system specifications or otherwise specifically authorized by the Government. Contractor must not use, and/or must physically disable or remove ports, protocols and services that are not specified in the control system specifications or required for operation of the control system. For devices that have a STIG or SRG related to Requirements for Least Functionality (such as configuration settings and port and device I/O access for least functionality), Contractor is required to install and configure the device in accordance with that STIG or SRGs.
CCI-000380	CM-7(b)	The organization defines for the information system prohibited or restricted functions, ports, protocols, and/or services.	Designer	IP Control Networks;	The organization is responsible for defining the prohibited or restricted functions, ports, protocols, and/or services for the control system.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-000381	CM-7(a)	The organization configures the information system to provide only essential capabilities.	Designer	IP Control Networks;	The contractor is responsible for configuring the control system device(s) to provide only essential capabilities.
CCI-000382	CM-7(b)	The organization configures the information system to prohibit or restrict the use of organization-defined functions, ports, protocols, and/or services.	Designer	IP Control Networks;	The contactor is responsible for configuring the control system device(s) to prohibit or restrict the use of organization-defined functions, ports, protocols, and/or services.
CCI-000389	CM-8(a)(1)	The organization develops and documents an inventory of information system components that accurately reflects the current information system.	Designer	Control System Inventory Report	This is met requiring the contractor to complete a Control System Inventory Report using the most current Inventory Spreadsheet listed at the www.wbdg.org documenting all devices, including networked devices, network infrastructure devices, non-networked devices, input devices (e.g. sensors) and output devices (e.g. actuators). Contractor is required that for each device, they must provide all applicable information for which there is a field on the spreadsheet in accordance with the instructions on the spreadsheet.
CCI-000392	CM-8(a)(2)	The organization develops and documents an inventory of information system components that includes all components within the authorization boundary of the information system.	Designer	Control System Inventory Report	This is met requiring the contractor to complete a Control System Inventory Report using the most current Inventory Spreadsheet listed at the www.wbdg.org documenting all devices, including networked devices, network infrastructure devices, non-networked devices, input devices (e.g. sensors) and output devices (e.g. actuators) that includes all components withing the authorization boundary of the system. Contractor is required that for each device, they must provide all applicable information for which there is a field on the spreadsheet in accordance with the instructions on the spreadsheet.
CCI-000398	CM-8(a)(4)	The organization defines information deemed necessary to achieve effective information system component accountability.	DoD-Defined Designer Non-Designer Impractical	Control System Inventory Report	This is met requiring the contractor to complete a Control System Inventory Report using the most current Inventory Spreadsheet listed at the www.wbdg.org documenting all devices, including networked devices, network infrastructure devices, non-networked devices, input devices (e.g. sensors) and output devices (e.g. actuators). Contractor is required that for each device, they must provide all applicable information for which there is a field on the spreadsheet in accordance with the instructions on the spreadsheet.
CCI-000764	IA-2	The information system uniquely identifies and authenticates organizational users (or processes acting on behalf of organizational users).	Enclave Designer Impractical	User Accounts; USER IDENTIFICATION AND AUTHENTICATION	Impractical; the controller systems do not support connectivity to a central validation system. The controllers do not support the use of PIV authentication.
CCI-000765	IA-2(1)	The information system implements multifactor authentication for network access to privileged accounts.	Enclave Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	Impractical; the controller systems do not support connectivity to a central validation system. The controllers do not support the use of PIV authentication.
CCI-000777	IA-3	The organization defines a list of specific and/or types of devices for which identification and authentication is required before establishing a connection to the information system.	DoD-Defined Enclave Designer Impractical	Control System Inventory Report; Device Identification and Authentication	This is partially met by requiring the contractor to provide a Control System Inventory Report using the most current Inventory Spreadsheet listed at the www.wbdg.org documenting all devices, including networked devices, network infrastructure devices, non-networked devices, input devices (e.g. sensors) and output devices (e.g. actuators). For each device contractor to provide all applicable information for which there is a field on the spreadsheet in accordance with the instructions on the spreadsheet. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06).
CCI-000778	IA-3	The information system uniquely identifies an organization defined list of specific and/or types of devices before establishing a local, remote, or network connection.	Enclave Designer Impractical	Control System Inventory Report; Device Identification and Authentication	This is partially met by requiring the contractor to provide a Control System Inventory Report using the most current Inventory Spreadsheet listed at the www.wbdg.org documenting all devices, including networked devices, network infrastructure devices, non-networked devices, input devices (e.g. sensors) and output devices (e.g. actuators). For each device contractor to provide all applicable information for which there is a field on the spreadsheet in accordance with the instructions on the spreadsheet. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06).
CCI-000803	IA-7	The information system implements mechanisms for authentication to a cryptographic module that meet the requirements of applicable federal laws, Executive Orders, directives, policies, regulations, standards, and guidance for such authentication.	Enclave Designer Impractical	Cryptographic Module Authentication	Impractical; Controllers and related equipment do not support authentication to a cryptographic module.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-001048	RA-3(a)	The organization conducts an assessment of risk of the information system and the information it processes, stores, or transmits that includes the likelihood and magnitude of harm from the unauthorized access, use, disclosure, disruption, modification, or destruction.	Designer Non-Designer	Control System Cybersecurity Documentation	This is met by implementation of the Cybersecurity Design Process as required by UFC 4-010-06. The organization is responsible to conduct a risk of the system and the information it processes, stores, or transmits that includes the likelihood and magnitude of harm from the unauthorized access, use, disclosure, disruption, modification, or destruction which is then documented by the Designer as per Section 3-1.1 Five Steps for Cybersecurity Design. This risk is revised during this processes as necessary, until the completion of the Design Review by the Government at the 35% Design Deliverable. The Design process concludes with the provision of the appropriate 25 05 11.XX UFGS Specification for the identified Control System(s) which the Contractor will be required to provide baseline Control System Cybersecurity Documentation at project end for all Control System, subsystems, and devices.
CCI-001054	RA-5(a)	The organization scans for vulnerabilities in the information system and hosted applications on an organization-defined frequency.	Enclave Designer Non-Designer	VULNERABILITY SCANNING	This ispartially met by requiring the contractor to ensure that all IP devices must be scannable, such that the device can be scanned by industry standard IP network scanning utilities without harm to the device, application, or functionality. For computers and applications running on computers contractor must meet relevant vulnerability scanning STIGs/SRGs and respond to approved DoD vulnerability scanning tools. For controllers, contractor must provide controllers that are scannable by standard control system discovery tools or control system browsers and return meaningful status information including the network inputs and outputs for the controller.This information must contain sufficient detail to detect vulnerabilities or exploits of the controller. Contractor must provide all software needed to scan the control system as the Control System Scanning Tools submittal. If the software required to scan the system is already installed at the project site or is provided under a separate section instead contractor must provide a statement indicating this. The organization is responsible to scan for vulnerabilities in the system and hosted applications according to the DoD defined frequency of every 30 days or as directed by an authoritative source (e.g. IAVM, CTOs, DTMs, STIGs) upon final acceptance of the system.
CCI-001055	RA-5(a)	The organization defines a frequency for scanning for vulnerabilities in the information system and hosted applications.	DoD-Defined Enclave Designer Impractical	VULNERABILITY SCANNING	This is partially met by requiring the contractor to ensure that all IP devices must be scannable, such that the device can be scanned by industry standard IP network scanning utilities without harm to the device, application, or functionality. For computers and applications running on computers contractor must meet relevant vulnerability scanning STIGs/SRGs and respond to approved DoD vulnerability scanning tools. For controllers, contractor must provide controllers that are scannable by standard control system discovery tools or control system browsers and return meaningful status information including the network inputs and outputs for the controller.This information must contain sufficient detail to detect vulnerabilities or exploits of the controller. Contractor must provide all software needed to scan the control system as the Control System Scanning Tools submittal. If the software required to scan the system is already installed at the project site or is provided under a separate section instead contractor must provide a statement indicating this. The organization is responsible to scan for vulnerabilities in the system and hosted applications according to the DoD defined frequency of every 30 days or as directed by an authoritative source (e.g. IAVM, CTOs, DTMs, STIGs) upon final acceptance of the system.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-001056	RA-5(a)	The organization scans for vulnerabilities in the information system and hosted applications when new vulnerabilities potentially affecting the system/applications are identified and reported.	Enclave Designer Non-Designer	VULNERABILITY SCANNING	This is partially met by requiring the contractor to ensure that all IP devices must be scannable, such that the device can be scanned by industry standard IP network scanning utilities without harm to the device, application, or functionality. For computers and applications running on computers contractor must meet relevant vulnerability scanning STIGs/SRGs and respond to approved DoD vulnerability scanning tools. For controllers, contractor must provide controllers that are scannable by standard control system discovery tools or control system browsers and return meaningful status information including the network inputs and outputs for the controller.This information must contain sufficient detail to detect vulnerabilities or exploits of the controller. Contractor must provide all software needed to scan the control system as the Control System Scanning Tools submittal. If the software required to scan the system is already installed at the project site or is provided under a separate section instead contractor must provide a statement indicating this. The organization is responsible to conduct vulnerability scans of the system and hosted applications when new vulnerabilities potentially affecting the system/applications are identified and reported via authoritative sources (e.g., IAVM, CTO, DTM, STIG, product vendor), upon final acceptance of the system.
CCI-001057	RA-5(b)	The organization employs vulnerability scanning tools and techniques that facilitate interoperability among tools and automate parts of the vulnerability management process by using standards for: enumerating platforms, software flaws, and improper configurations; formatting checklists and test procedures; and measuring vulnerability impact.	Enclave Designer Non-Designer Impractical	VULNERABILITY SCANNING	This is partially met by requiring the contractor to ensure that all IP devices must be scannable, such that the device can be scanned by industry standard IP network scanning utilities without harm to the device, application, or functionality. For computers and applications running on computers contractor must meet relevant vulnerability scanning STIGs/SRGs and respond to approved DoD vulnerability scanning tools. For controllers, contractor must provide controllers that are scannable by standard control system discovery tools or control system browsers and return meaningful status information including the network inputs and outputs for the controller.This information must contain sufficient detail to detect vulnerabilities or exploits of the controller. Contractor must provide all software needed to scan the control system as the Control System Scanning Tools submittal. If the software required to scan the system is already installed at the project site or is provided under a separate section instead contractor must provide a statement indicating this. The organization is responsible to employ the DoD Enterprise scanning tool to scan for vulnerabilities in the system and hosted applications according to the DoD defined frequency of every 30 days or as directed by an authoritative source (e.g. IAVM, CTOs, DTMs, STIGs) upon final acceptance of the system.
CCI-001058	RA-5(c)	The organization analyzes vulnerability scan reports and results from security control assessments.	Enclave Designer Non-Designer	VULNERABILITY SCANNING	This is partially met by requiring the contractor to ensure that all IP devices must be scannable, such that the device can be scanned by industry standard IP network scanning utilities without harm to the device, application, or functionality. For computers and applications running on computers contractor must meet relevant vulnerability scanning STIGs/SRGs and respond to approved DoD vulnerability scanning tools. For controllers, contractor must provide controllers that are scannable by standard control system discovery tools or control system browsers and return meaningful status information including the network inputs and outputs for the controller.This information must contain sufficient detail to detect vulnerabilities or exploits of the controller. Contractor must provide all software needed to scan the control system as the Control System Scanning Tools submittal. If the software required to scan the system is already installed at the project site or is provided under a separate section instead contractor must provide a statement indicating this. The organization is responsible to analyze vulnerability scan reports and security control assessment results with the intent of identifying legitimate vulnerabilities and the relationship between vulnerabilities and security controls in the system and hosted applications according to the DoD defined frequency of every 30 days or as directed by an authoritative source (e.g. IAVM, CTOs, DTMs, STIGs) upon final acceptance of the system.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-001059	RA-5(d)	The organization remediates legitimate vulnerabilities in organization-defined response times in accordance with an organizational assessment risk.	Enclave Designer Non-Designer Impractical	VULNERABILITY SCANNING	This is partially met by requiring the contractor to ensure that all IP devices must be scannable, such that the device can be scanned by industry standard IP network scanning utilities without harm to the device, application, or functionality. For computers and applications running on computers contractor must meet relevant vulnerability scanning STIGs/SRGs and respond to approved DoD vulnerability scanning tools. For controllers, contractor must provide controllers that are scannable by standard control system discovery tools or control system browsers and return meaningful status information including the network inputs and outputs for the controller.This information must contain sufficient detail to detect vulnerabilities or exploits of the controller. Contractor must provide all software needed to scan the control system as the Control System Scanning Tools submittal. If the software required to scan the system is already installed at the project site or is provided under a separate section instead contractor must provide a statement indicating this. The organization is responsible to take corrective actions as appropriate on legitimate vulnerabilities identified in RA-5, CCI 001058 IAW an authoritative source (e.g. IAVM, CTOs, DTMs, STIGs) when scanning for vulnerabilities in the system and hosted applications according to the DoD defined frequency of every 30 days or as directed by an authoritative source (e.g. IAVM, CTOs, DTMs, STIGs) upon final acceptance of the system.
CCI-001097	SC-7(a)	The information system monitors and controls communications at the external boundary of the system and at key internal boundaries within the system.	DoD-Defined Enclave Designer Impractical	Physical Security Denial of Service Protection	Enclave; The network is monitored by the enclave. There is no local monitoring provided by the local system.
CCI-001241	SI-3(c)(1)	The organization configures malicious code protection mechanisms to perform periodic scans of the information system on an organization-defined frequency.	Enclave Designer Non-Designer	Malicious Code Protection	Impractical; not applicable at the computer level.
CCI-001253	SI-4(a)(1)	The organization defines the objectives of monitoring for attacks and indicators of potential attacks on the information system.	DoD-Defined Enclave Designer Impractical	Malicious Code Protection	Impractical; not applicable at the computer level.
CCI-001423	AC-7(a)	The organization defines the time period in which the organization-defined maximum number of consecutive invalid logon attempts occur.	DoD-Defined Designer Impractical	Unsuccessful Logon Attempts	For Devices MINIMALLY Supporting Accounts and Devices FULLY Supporting Accounts, this is met by requiring the contractor to configure the device to unlock the user account after the DoD Defined time period of 15 Minutes.
CCI-001438	AC-18(a)	The organization establishes usage restrictions for wireless access.	Designer Non-Designer	Wireless and Wired Broadcast Communication	Wireless communication is not authorized for this project.
CCI-001439	AC-18(a)	The organization establishes implementation guidance for wireless access.	Designer Non-Designer	Wireless and Wired Broadcast Communication	Wireless communication is not authorized for this project.
CCI-001441	AC-18(b)	The organization authorizes wireless access to the information system prior to allowing such connections.	Designer Non-Designer	Wireless and Wired Broadcast Communication	Wireless communication is not authorized for this project.
CCI-001459	AU-12(a)	The organization defines information system components that provide audit record generation capability.	DoD-Defined Designer Impractical	Audit Events, Content of Audit Records, and Audit Generation	The organization is responsible for defining the control system components that provide audit record generation capability.
CCI-001485	AU-2(d)	The organization defines the events which are to be audited on the information system on an organization-defined frequency of (or situation requiring) auditing for each identified event.	Designer Non-Designer	Audit Events, Content of Audit Records, and Audit Generation	For controllers capable of performing auditing, this is met by requiring the contractor to configure the devices as defined in AU-2 (a), CCI-000123. Upon final acceptance of the control system, the organization is responsible perform ongoing risk assessments of current threat information and environment or the control system, and select events accordingly as DoD has determined that the events are not appropriate to define at the Enterprise level.
CCI-001487	AU-3	The information system generates audit records containing information that establishes the identity of any individuals or subjects associated with the event.	Designer Impractical	Audit Events, Content of Audit Records, and Audit Generation	For controllers capable of performing auditing, this is met by requiring the contractor to ensure all devices be configured to generate audit records containing the information established in AU-2(a), CCI-000123, which contain information according to CCI-000130, CCI-000131, CCI-000132, CCI-000133, CCI-000134, AND CCI-001462 that establishes the identity of any individuals or subjects associated with the event. Contractor is required to determine and apply all applicable STIGs/SRGs that pertain to CCI-001487.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-001544	IA-5(c)	The organization manages information system authenticators by ensuring that authenticators have sufficient strength of mechanism for their intended use.	Designer Non-Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	This is met by the contractor ensuring that authenticators have sufficient strength of mechanism for their intended use through the required instructions as provided for CCI-000192, CCI-000193, CCI-000194, CCI-000195, CCI-000196, CCI-000197, CCI-000198, CCI-000199, CCI-000200, CCI-000205. Where these requirements conflict the contractor is instructed to apply the following order of precedence: 1) If present, Device Specific Requirements take precedence over any other requirements; and then 2) multifactor authentication requirements take precedence over password requirements.
CCI-001571	AU-2(a)	The organization defines the information system auditable events.	DoD-Defined Designer Impractical	Audit Events, Content of Audit Records, and Audit Generation	For controllers capable of performing auditing, this is met by requiring the contractor to ensure all devices be configured to generate audit records containing the information established in AU-2(a), CCI-000123, which contain information according to CCI-000130, CCI-000131, CCI-000132, CCI-000133, CCI-000134, CCI-001462, CCI-001571 that establishes the identity of any individuals or subjects associated with the event. Contractor is required to determine and apply all applicable STIGs/SRGs that pertain to CCI-001487.
CCI-001588	CM-6(a)	The organization-defined security configuration checklists reflect the most restrictive mode consistent with operational requirements.	DoD-Defined Designer Non-Designer Impractical	IP Control Networks;	The organization is responsible for ensuring that the organization-defined security configuration checklists reflect the most restrictive mode consistent with operational requirements.
CCI-001610	IA-5(g)	The organization defines the time period (by authenticator type) for changing/refreshing authenticators.	DoD-Defined Designer Non-Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	This is met by the contractor ensuring that authenticators have sufficient strength of mechanism for their intended use through the required instructions as provided for CCI-000192, CCI-000193, CCI-000194, CCI-000195, CCI-000196, CCI-000197, CCI-000198, CCI-000199, CCI-000200, CCI-000205, CCI-001544. Where these requirements conflict the contractor is instructed to apply the following order of precedence: 1) If present, Device Specific Requirements take precedence over any other requirements; and then 2) multifactor authentication requirements take precedence over password requirements.
CCI-001611	IA-5(1)(a)	The organization defines the minimum number of special characters for password complexity enforcement.	DoD-Defined Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	This is met by the contractor ensuring that authenticators have sufficient strength of mechanism for their intended use through the required instructions as provided for CCI-000192, CCI-000193, CCI-000194, CCI-000195, CCI-000196, CCI-000197, CCI-000198, CCI-000199, CCI-000200, CCI-000205, CCI-001544, CCI-001610. Where these requirements conflict the contractor is instructed to apply the following order of precedence: 1) If present, Device Specific Requirements take precedence over any other requirements; and then 2) multifactor authentication requirements take precedence over password requirements.
CCI-001612	IA-5(1)(a)	The organization defines the minimum number of upper case characters for password complexity enforcement.	DoD-Defined Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	This is met by the contractor ensuring that authenticators have sufficient strength of mechanism for their intended use through the required instructions as provided for CCI-000192, CCI-000193, CCI-000194, CCI-000195, CCI-000196, CCI-000197, CCI-000198, CCI-000199, CCI-000200, CCI-000205, CCI-001544, CCI-001610, CCI-001611. Where these requirements conflict the contractor is instructed to apply the following order of precedence: 1) If present, Device Specific Requirements take precedence over any other requirements; and then 2) multifactor authentication requirements take precedence over password requirements.
CCI-001613	IA-5(1)(a)	The organization defines the minimum number of lower case characters for password complexity enforcement.	DoD-Defined Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	This is met by the contractor ensuring that authenticators have sufficient strength of mechanism for their intended use through the required instructions as provided for CCI-000192, CCI-000193, CCI-000194, CCI-000195, CCI-000196, CCI-000197, CCI-000198, CCI-000199, CCI-000200, CCI-000205, CCI-001544, CCI-001610, CCI-001611, CCI-001612. Where these requirements conflict the contractor is instructed to apply the following order of precedence: 1) If present, Device Specific Requirements take precedence over any other requirements; and then 2) multifactor authentication requirements take precedence over password requirements.
CCI-001614	IA-5(1)(a)	The organization defines the minimum number of numeric characters for password complexity enforcement.	DoD-Defined Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	This is met by the contractor ensuring that authenticators have sufficient strength of mechanism for their intended use through the required instructions as provided for CCI-000192, CCI-000193, CCI-000194, CCI-000195, CCI-000196, CCI-000197, CCI-000198, CCI-000199, CCI-000200, CCI-000205, CCI-001544, CCI-001610, CCI-001611, CCI-001612, CCI-001613. Where these requirements conflict the contractor is instructed to apply the following order of precedence: 1) If present, Device Specific Requirements take precedence over any other requirements; and then 2) multifactor authentication requirements take precedence over password requirements.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-001615	IA-5(1)(b)	The organization defines the minimum number of characters that are changed when new passwords are created.	DoD-Defined Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	This is met by the contractor ensuring that authenticators have sufficient strength of mechanism for their intended use through the required instructions as provided for CCI-000192, CCI-000193, CCI-000194, CCI-000195, CCI-000196, CCI-000197, CCI-000198, CCI-000199, CCI-000200, CCI-000205, CCI-001544, CCI-001610, CCI-001611, CCI-001612, CCI-001613, CCI-001614. Where these requirements conflict the contractor is instructed to apply the following order of precedence: 1) If present, Device Specific Requirements take precedence over any other requirements; and then 2) multifactor authentication requirements take precedence over password requirements.
CCI-001616	IA-5(1)(d)	The organization defines minimum password lifetime restrictions.	DoD-Defined Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	This is met by the contractor ensuring that authenticators have sufficient strength of mechanism for their intended use through the required instructions as provided for CCI-000192, CCI-000193, CCI-000194, CCI-000195, CCI-000196, CCI-000197, CCI-000198, CCI-000199, CCI-000200, CCI-000205, CCI-001544, CCI-001610, CCI-001611, CCI-001612, CCI-001613, CCI-001614, CCI-001615. Where these requirements conflict the contractor is instructed to apply the following order of precedence: 1) If present, Device Specific Requirements take precedence over any other requirements; and then 2) multifactor authentication requirements take precedence over password requirements.
CCI-001617	IA-5(1)(d)	The organization defines maximum password lifetime restrictions.	DoD-Defined Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	This is met by the contractor ensuring that authenticators have sufficient strength of mechanism for their intended use through the required instructions as provided for CCI-000192, CCI-000193, CCI-000194, CCI-000195, CCI-000196, CCI-000197, CCI-000198, CCI-000199, CCI-000200, CCI-000205, CCI-001544, CCI-001610, CCI-001611, CCI-001612, CCI-001613, CCI-001614, CCI-001615, CCI-001616. Where these requirements conflict the contractor is instructed to apply the following order of precedence: 1) If present, Device Specific Requirements take precedence over any other requirements; and then 2) multifactor authentication requirements take precedence over password requirements.
CCI-001618	IA-5(1)(e)	The organization defines the number of generations for which password reuse is prohibited.	DoD-Defined Enclave Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	This is met by the contractor ensuring that authenticators have sufficient strength of mechanism for their intended use through the required instructions as provided for CCI-000192, CCI-000193, CCI-000194, CCI-000195, CCI-000196, CCI-000197, CCI-000198, CCI-000199, CCI-000200, CCI-000205, CCI-001544, CCI-001610, CCI-001611, CCI-001612, CCI-001613, CCI-001614, CCI-001615, CCI-001616, CCI-001617. Where these requirements conflict the contractor is instructed to apply the following order of precedence: 1) If present, Device Specific Requirements take precedence over any other requirements; and then 2) multifactor authentication requirements take precedence over password requirements. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06)
CCI-001619	IA-5(1)(a)	The information system enforces password complexity by the minimum number of special characters used.	Enclave Designer	USER IDENTIFICATION AND AUTHENTICATION	This is met by the contractor ensuring that authenticators have sufficient strength of mechanism for their intended use through the required instructions as provided for CCI-000192, CCI-000193, CCI-000194, CCI-000195, CCI-000196, CCI-000197, CCI-000198, CCI-000199, CCI-000200, CCI-000205, CCI-001544, CCI-001610, CCI-001611, CCI-001612, CCI-001613, CCI-001614, CCI-001615, CCI-001616, CCI-001617, CCI-001618. Where these requirements conflict the contractor is instructed to apply the following order of precedence: 1) If present, Device Specific Requirements take precedence over any other requirements; and then 2) multifactor authentication requirements take precedence over password requirements. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06)

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-001641	RA-5(a)	The organization defines the process for conducting random vulnerability scans on the information system and hosted applications.	Enclave Designer Non-Designer Impractical	VULNERABILITY SCANNING	This is partially met by requiring the contractor to ensure that all IP devices must be scannable, such that the device can be scanned by industry standard IP network scanning utilities without harm to the device, application, or functionality. For computers and applications running on computers contractor must meet relevant vulnerability scanning STIGs/SRGs and respond to approved DoD vulnerability scanning tools. For controllers, contractor must provide controllers that are scannable by standard control system discovery tools or control system browsers and return meaningful status information including the network inputs and outputs for the controller.This information must contain sufficient detail to detect vulnerabilities or exploits of the controller. Contractor must provide all software needed to scan the control system as the Control System Scanning Tools submittal. If the software required to scan the system is already installed at the project site or is provided under a separate section instead contractor must provide a statement indicating this. The organization is responsible to scan for vulnerabilities in the system and hosted applications according to the DoD defined frequency of every 30 days or as directed by an authoritative source (e.g. IAVM, CTOs, DTMs, STIGs) upon final acceptance of the system.
CCI-001643	RA-5(a)	The organization scans for vulnerabilities in the information system and hosted applications in accordance with the organization-defined process for random scans.	Enclave Designer Non-Designer	VULNERABILITY SCANNING	This is partially met by requiring the contractor to ensure that all IP devices must be scannable, such that the device can be scanned by industry standard IP network scanning utilities without harm to the device, application, or functionality. For computers and applications running on computers contractor must meet relevant vulnerability scanning STIGs/SRGs and respond to approved DoD vulnerability scanning tools. For controllers, contractor must provide controllers that are scannable by standard control system discovery tools or control system browsers and return meaningful status information including the network inputs and outputs for the controller.This information must contain sufficient detail to detect vulnerabilities or exploits of the controller. Contractor must provide all software needed to scan the control system as the Control System Scanning Tools submittal. If the software required to scan the system is already installed at the project site or is provided under a separate section instead contractor must provide a statement indicating this. The organization is responsible to scan for vulnerabilities in the system and hosted applications according to the DoD defined frequency of every 30 days or as directed by an authoritative source (e.g. IAVM, CTOs, DTMs, STIGs), and to document the vulnerability scans as an audit trail for future reference. The audit trail must be maintained IAW DoD, CYBERCOM, or component policies upon final acceptance of the system.
CCI-001755	CM-6(c)	The organization defines the information system components for which any deviation from the established configuration settings are to be identified, documented and approved.	DoD-Defined Designer Non-Designer Impractical	IP Control Networks;	This is met by requiring the Contractor to ensure that IP Networks must be Ethernet networks and must use switches which are Ethernet Switches as defined in this Section. Contractor must not use nonsecure functions, ports, protocols and services as defined in DODI 8551.01 unless those ports, protocols and services are specifically required by the control system specifications or otherwise specifically authorized by the Government. Contractor must not use, and/or must physically disable or remove ports, protocols and services that are not specified in the control system specifications or required for operation of the control system. For devices that have a STIG or SRG related to Requirements for Least Functionality (such as configuration settings and port and device I/O access for least functionality), Contractor is required to install and configure the device in accordance with that STIG or SRGs.
CCI-001761	CM-7(1)(b)	The organization defines the functions, ports, protocols and services within the information system that are to be disabled when deemed unnecessary and/or nonsecure.	Designer	Information Flow Enforcement; IP Control Networks;	The organization is responsible for defining the functions, ports, protocols and services within the control system that are to be disabled when deemed unnecessary and/or nonsecure.
CCI-001762	CM-7(1)(b)	The organization disables organization-defined functions, ports, protocols, and services within the information system deemed to be unnecessary and/or nonsecure.	Designer Impractical	Information Flow Enforcement; IP Control Networks;	The contractor is responsible for disabling organization-defined functions, ports, protocols, and services within the control system deemed to be unnecessary and/or nonsecure.
CCI-001889	AU-8(b)	The information system records time stamps for audit records that meets organization-defined granularity of time measurement.	Designer	Audit Time Stamps	The contractor is responsible for ocnfiguring the control system device(s) to record time stamps for audit records that meets organization-defined granularity of time measurement.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-001890	AU-8(b)	The information system records time stamps for audit records that can be mapped to Coordinated Universal Time (UTC) or Greenwich Mean Time (GMT).	Designer	Audit Time Stamps	The contractor is responsible for ocnfiguring the control system device(s) to record time stamps for audit records that can be mapped to Coordinated Universal Time (UTC) or Greenwich Mean Time (GMT).
CCI-001910	AU-12(b)	The organization defines the personnel or roles allowed select which auditable events are to be audited by specific components of the information system.	DoD-Defined Designer Impractical	Audit Events, Content of Audit Records, and Audit Generation	This is met by requiring the contractor to configure the controller to generate audit records for the defined subset of the auditable events defined in AU-2, CCI-000126, which are listed the events listed in AU-2 (a), CCI-000123 per occurrence as required by DoD, which will contain information that establishes the outcome of the event as defined by AU-3, CCI-000134. Contractor is required to determine and apply all applicable STIGs/SRGs applicable STIGs or SRGs that pertains to CCI-000172. For controllers with the capability to store audit records, contractor to configure the generating and storing audit records locally in its internal memory for these records to be retrieved and reviewed during routine maintenance or inspection by the ISSM or individual appointed by the ISSM upon final acceptance of the control system. Contractor to provide step-by-step documentation for this process as a part of the control systems final CYBERSECURITY DOCUMENTATION submittal.
CCI-001953	IA-2(12)	The information system accepts Personal Identity Verification (PIV) credentials.	Enclave Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	Impractical; the controller systems do not support connectivity to a central validation system. The controllers do not support the use of PIV authentication.
CCI-001954	IA-2(12)	The information system electronically verifies Personal Identity Verification (PIV) credentials.	Enclave Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	Impractical; the controller systems do not support connectivity to a central validation system. The controllers do not support the use of PIV authentication.
CCI-001958	IA-3	The information system authenticates an organization defined list of specific and/or types of devices before establishing a local, remote, or network connection.	Enclave Designer Impractical	Control System Inventory Report; Device Identification and Authentication	This is partially met by requiring the contractor to provide a Control System Inventory Report using the most current Inventory Spreadsheet listed at the www.wbdg.org documenting all devices, including networked devices, network infrastructure devices, non-networked devices, input devices (e.g. sensors) and output devices (e.g. actuators). For each device provide all applicable information for which there is a field on the spreadsheet in accordance with the instructions on the spreadsheet. Contractor is required to determine and apply all applicable STIGs/SRGs. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06).
CCI-001989	IA-5(e)	The organization manages information system authenticators by changing default content of authenticators prior to information system installation.	Designer	USER IDENTIFICATION AND AUTHENTICATION	This is met by requiring the contractor to provide a Confidential Password Report for all devices with a password which documents a change of all passwords from the default password as part of the final CYBERSECURITY DOCUMENTATION submittal package. The Contractor is required to coordinate selection of passwords with the site designated Password Point of Contact. Contractor may not use the same password for more than one device unless specifically instructed to do so. Contractor is required to provide the Confidential Password Report which shall include documenting the password for each device and describing the procedure to change the password for each device.
CCI-002002	IA-5(11)	The organization defines the token quality requirements to be employed by the information system mechanisms for token-based authentication.	DoD-Defined Enclave Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	Not implemented. DoDI 8520.03 defines types of authentication credentials that are acceptable for authentication to different systems based on the systems' information sensitivity levels and the users' access environments. Most OT systems do not have the ability to accept token-based authentication credentials unless connected to an ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06).
CCI-002003	IA-5(11)	The information system, for token-based authentication, employs mechanisms that satisfy organization-defined token quality requirements.	Enclave Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	Not implemented. DoDI 8520.03 defines types of authentication credentials that are acceptable for authentication to different systems based on the systems' information sensitivity levels and the users' access environments. Most OT systems do not have the ability to accept token-based authentication credentials unless connected to an ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06).
CCI-002041	IA-5(1)(f)	The information system allows the use of a temporary password for system logons with an immediate change to a permanent password.	Enclave Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	Not applicable at the controller; This is managed at PIT L2 computer or above which allows for minimum lifetime of 24 hours which allows the use of a temporary password for system logons with an immediate change to a permanent password.)

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-002102	CA-9(a)	The organization defines the information system components or classes of components that that are authorized internal connections to the information system.	Designer	Network Communication Report	This is met by requiring the contractor to provide a Network Communication Report. For each networked device, contractor is required to document the communication characteristics of the device including communication protocols, services used, encryption employed, and a general description of what information is communicated over the network. For each device using IP, contractor is required to document all TCP and UDP ports used. For non-IP communications, contractor is required to document communication protocol and media used. The organization is responsible to define and document any other system components or classes of components that that are authorized internal connections to the system upon final acceptance of the system as DoD has determined the information system components are not appropriate to define at the Enterprise level.
CCI-002103	CA-9(b)	The organization documents, for each internal connection, the interface characteristics.	Designer	Network Communication Report	This is met by requiring the contractor to provide a Network Communication Report. For each networked device, contractor is required to document the communication characteristics of the device including communication protocols, services used, encryption employed, and a general description of what information is communicated over the network. For each device using IP, contractor is required to document all TCP and UDP ports used. For non-IP communications, contractor is required to document communication protocol and media used.
CCI-002104	CA-9(b)	The organization documents, for each internal connection, the security requirements.	Designer	Network Communication Report	This is met by requiring the contractor to provide a Network Communication Report. For each networked device, contractor is required to document the communication characteristics of the device including communication protocols, services used, encryption employed, and a general description of what information is communicated over the network. For each device using IP, contractor is required to document all TCP and UDP ports used. For non-IP communications, contractor is required to document communication protocol and media used. Contractor is required to provide a copy of a riser diagram in one-line format overlayed on a facility schematic as part of the final CYBERSECURITY DOCUMENTATION.
CCI-002105	CA-9(b)	The organization documents, for each internal connection, the nature of the information communicated.	Designer	Network Communication Report	This is met by requiring the contractor to provide a Network Communication Report. For each networked device, contractor is required to document the communication characteristics of the device including communication protocols, services used, encryption employed, and a general description of what information is communicated over the network. For each device using IP, contractor is required to document all TCP and UDP ports used. For non-IP communications, contractor is required to document communication protocol and media used. Contractor is required to provide a copy of a riser diagram in one-line format overlayed on a facility schematic as part of the final CYBERSECURITY DOCUMENTATION. The contractor is required to provide any documentation or submittals related to network communication, such as Points Schedules (CCI-002105). If the control system's specifications require a riser diagram submittal that meets this requirement, the contractor can provide a copy of that submittal instead as the cybersecurity riser diagram as part of the final CYBERSECURITY DOCUMENTATION.
CCI-002110	AC-2(a)	The organization defines the information system account types that support the organizational missions/business functions.	Designer	User Accounts	This is met by requiring the contractor to ensure that any user interface supporting user accounts (either FULLY or MINIMALLY) must limit access according to specified limitations for each account, as that system is designed and as provided by the organization as DoD has DoD has determined the information system account types are not appropriate to define at the Enterprise level which determine system account types that support the organizational missions/business functions.
CCI-002236	AC-7(b)	The organization defines the time period the information system will automatically lock the account or node when the maximum number of unsuccessful attempts is exceeded.	DoD-Defined Designer Impractical	Unsuccessful Logon Attempts	For Devices MINIMALLY Supporting Accounts and Devices FULLY Supporting Accounts, this is met by requiring the contractor to configure the device to ensure that once an account is locked, the account must stay locked until unlocked by an administrator. If the account being locked is the sole administrator account on the device, the account must stay locked for 1 hour and then automatically unlock.
CCI-002237	AC-7(b)	The organization defines the delay algorithm to be employed by the information system to delay the next login prompt when the maximum number of unsuccessful attempts is exceeded.	DoD-Defined Designer Impractical	Unsuccessful Logon Attempts	For Devices MINIMALLY Supporting Accounts and Devices FULLY Supporting Accounts, this is met by requiring the contractor to configure the device to delay the next login prompt according to the DoD Defined Algorith of 5 Seconds.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-002238	AC-7(b)	The information system automatically locks the account or node for either an organization-defined time period, until the locked account or node is released by an administrator, or delays the next login prompt according to the organization-defined delay algorithm when the maximum number of unsuccessful attempts is exceeded.	Designer Impractical	Unsuccessful Logon Attempts	For Devices MINIMALLY Supporting Accounts and Devices FULLY Supporting Accounts, this is met by requiring the contractor to configure the device to ensure the locked account is released by an administrator and delays the next login prompt for a minimum of 5 seconds when the maximum number of unsuccessful attempts is exceeded. Contractor is required to determine and apply applicable STIGs or SRGs that pertains to CCI-002238.
CCI-002243	AC-8(a)(1)	The organization-defined information system use notification message or banner is to state that users are accessing a U.S. Government information system.	DoD-Defined Enclave Designer Impractical	System Use Notification	See CCI-000048
CCI-002244	AC-8(a)(2)	The organization-defined information system use notification message or banner is to state that information system usage may be monitored, recorded, and subject to audit.	DoD-Defined Enclave Designer Impractical	System Use Notification	See CCI-000048
CCI-002245	AC-8(a)(3)	The organization-defined information system use notification message or banner is to state that unauthorized use of the information system is prohibited and subject to criminal and civil penalties.	DoD-Defined Enclave Designer Impractical	System Use Notification	See CCI-000048
CCI-002246	AC-8(a)(4)	The organization-defined information system use notification message or banner is to state that use of the information system indicates consent to monitoring and recording.	DoD-Defined Enclave Designer Impractical	System Use Notification	See CCI-000048
CCI-002247	AC-8(a)	The organization defines the use notification message or banner the information system displays to users before granting access to the system.	DoD-Defined Enclave Designer Impractical	System Use Notification	See CCI-000048
CCI-002248	AC-8(c)(1)	The organization defines the conditions of use which are to be displayed to users of the information system before granting further access.	DoD-Defined Enclave Designer Impractical	System Use Notification	See CCI-000048
CCI-002323	AC-18(a)	The organization establishes configuration/connection requirements for wireless access.	Designer Non-Designer	Wireless and Wired Broadcast Communication	Wireless communication is not authorized for this project.
CCI-002449	SC-13	The organization defines the cryptographic uses, and type of cryptography required for each use, to be implemented by the information system.	DoD-Defined Enclave Designer Impractical	Cryptographic Protection	The organization is responsible for defining the cryptographic uses, and type of cryptography required for each use, to be implemented by the control system.
CCI-002450	SC-13	The information system implements organization-defined cryptographic uses and type of cryptography required for each use in accordance with applicable federal laws, Executive Orders, directives, policies, regulations, and standards.	Enclave Designer Impractical	Cryptographic Protection	This is addressed by requiring and employing encrypted sessions for communications.
CCI-002530	SC-39	The information system maintains a separate execution domain for each executing process.	Designer	---	The control system device maintains a separate execution domain for each executing process within the limitations of the device.
CCI-002544	SC-41	The organization defines the information systems or information system components on which organization-defined connection ports or input/output devices are to be physically disabled or removed.	Enclave Designer Non-Designer	IP Control Networks	The organization is responsible for defining the control systems or control system components on which organization-defined connection ports or input/output devices are to be physically disabled or removed.
CCI-002545	SC-41	The organization defines the connection ports or input/output devices that are to be physically disabled or removed from organization-defined information systems or information system components.	Enclave Designer Non-Designer	IP Control Networks	The organization is responsible for defining the connection ports or input/output devices that are to be physically disabled or removed from organization-defined control systems or control system components.
CCI-002546	SC-41	The organization physically disables or removes organization-defined connection ports or input/output devices on organization-defined information systems or information system components.	Designer Impractical	IP Control Networks	The contractor is responsible for physically disabling or removing organization-defined connection ports or input/output devices on organization-defined control systems or control system components.
CCI-002623	SI-3(c)(1)	The organization defines the frequency for performing periodic scans of the information system for malicious code.	DoD-Defined Designer Impractical	Malicious Code Protection	Impractical; not applicable at the computer level.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-002645	SI-4(b)	The organization defines the techniques and methods to be used to identify unauthorized use of the information system.	Enclave Designer Non-Designer	Information System Monitoring	This is partially met by requiring the contractor to provide all control system Cybersecurity Documentation in accordance with all required Control System Cybersecurity Documentation submittals as applicable which documents techniques and methods to be used to identify unauthorized use of the control system. For all other requirements, the organization is responsible to determine any additional techniques and methods (such as use of/connection to and enclave) as DoD has determined these are not appropriate to define at the Enterprise level. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06).
CCI-002773	SI-17	The organization defines the fail-safe procedures to be implemented by the information system when organization-defined failure conditions occur.	Designer	Control System Inventory Report; SAFE MODE AND FAIL SAFE OPERATION	This is partially met by requiring the contractor to provide a Control System Inventory Report using the most current Inventory Spreadsheet listed at the www.wbdg.org documenting all devices, including networked devices, network infrastructure devices, non-networked devices, input devices (e.g. sensors) and output devices (e.g. actuators). For each device provide all applicable information for which there is a field on the spreadsheet in accordance with the instructions on the spreadsheet. Contractor is required to determine and apply all applicable STIGs/SRGs. Fail-safe procedures to be implemented by the control system are defined in that system's specification's section of its sequence of operations as designed by the Lead Engineer of the control system. For all control system components with an applicable STIG or SRG, contractor to configure the component in accordance with all applicable STIGs and SRGs.
CCI-002774	SI-17	The organization defines the failure conditions which, when they occur, will result in the information system implementing organization-defined fail-safe procedures.	Designer	Control System Inventory Report; SAFE MODE AND FAIL SAFE OPERATION	This is partially met by requiring the contractor to provide a Control System Inventory Report using the most current Inventory Spreadsheet listed at the www.wbdg.org documenting all devices, including networked devices, network infrastructure devices, non-networked devices, input devices (e.g. sensors) and output devices (e.g. actuators). For each device provide all applicable information for which there is a field on the spreadsheet in accordance with the instructions on the spreadsheet. Contractor is required to determine and apply all applicable STIGs/SRGs. Fail-safe procedures to be implemented by the control system are defined in that system's specification's section of its sequence of operations as designed by the Lead Engineer of the control system. For all control system components with an applicable STIG or SRG, contractor to configure the component in accordance with all applicable STIGs and SRGs.
CCI-002775	SI-17	The information system implements organization-defined fail-safe procedures when organization-defined failure conditions occur.	Designer	Control System Inventory Report; SAFE MODE AND FAIL SAFE OPERATION	This is partially met by requiring the contractor to provide a Control System Inventory Report using the most current Inventory Spreadsheet listed at the www.wbdg.org documenting all devices, including networked devices, network infrastructure devices, non-networked devices, input devices (e.g. sensors) and output devices (e.g. actuators). For each device provide all applicable information for which there is a field on the spreadsheet in accordance with the instructions on the spreadsheet. Contractor is required to determine and apply all applicable STIGs/SRGs. Fail-safe procedures to be implemented by the control system are defined in that system's specification's section of its sequence of operations as designed by the Lead Engineer of the control system. For all control system components with an applicable STIG or SRG, contractor to configure the component in accordance with all applicable STIGs and SRGs.
CCI-002855	CP-12	The information system, when organization-defined conditions are detected, enters a safe mode of operation with organization-defined restrictions of safe mode of operation.	Designer	SAFE MODE AND FAIL SAFE OPERATION	This is met through the Engineering Design Process as defineed by UFC 1-200-01 DoD Building Code that is the foundational document of the UFC program in providing general building requirements and overarching criteria and documents. Throughout the Design process, the Lead Engineer coordinates with the organization to any requirements for the control system needed to meet CP-12, Safe Mode or SI-17, Fail-Safe Procedures to determine/define when organization-defined conditions are detected, the control system will enter a safe mode of operation with organization-defined restrictions of safe mode of operation. The contractor is then required to determine all applicable STIGs or SRGs, and then to configure the component in accordance with all applicable STIGs and SRGs.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-002856	CP-12	The organization defines the conditions, that when detected, the information system enters a safe mode of operation with organization-defined restrictions of safe mode of operation.	Designer	SAFE MODE AND FAIL SAFE OPERATION	This is met through the Engineering Design Process as defineed by UFC 1-200-01 DoD Building Code that is the foundational document of the UFC program in providing general building requirements and overarching criteria and documents. Throughout the Design process, the Lead Engineer coordinates with the organization to define any requirements for the control system needed to meet CP-12, Safe Mode or SI-17, Fail-Safe Procedures to be implemented by the control system when the control system enters a safe mode of operation with organization-defined restrictions of safe mode of operation as DoD has determined the fail-safe procedures are not appropriate to define at the Enterprise level. The contractor is then required to determine all applicable STIGs or SRGs, and then to configure the component in accordance with all applicable STIGs and SRGs.
CCI-002857	CP-12	The organization defines the restrictions of safe mode of operation that the information system will enter when organization-defined conditions are detected.	Designer	SAFE MODE AND FAIL SAFE OPERATION	This is met through the Engineering Design Process as defineed by UFC 1-200-01 DoD Building Code that is the foundational document of the UFC program in providing general building requirements and overarching criteria and documents. Throughout the Design process, the Lead Engineer coordinates with the organization to define any requirements for the control system needed to meet CP-12, Safe Mode or SI-17, Fail-Safe Procedures to be implemented by the control system when organization-defined conditions are detected as DoD has determined the restrictions on safe mode of operation are not appropriate to define at the Enterprise level. The contractor is then required to determine all applicable STIGs or SRGs, and then to configure the component in accordance with all applicable STIGs and SRGs.
CCI-003051	PL-2(a)(2)	The organization's security plan for the information system explicitly defines the authorization boundary for the system.	Enclave Designer Non-Designer	Cybersecurity Riser Diagram	Contractor is required to provide a copy of a riser diagram in one-line format overlayed on a facility schematic as part of the final CYBERSECURITY DOCUMENTATION which defines the authorization boundary for the system. The organization is responsible to use this diagram to explicitly define within the security plan the authorization boundary for the system upon final acceptance of the system. All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06).
CCI-003053	PL-2(a)(4)	The organization's security plan for the information system provides the security categorization of the information system including supporting rationale.	Designer Non-Designer	Cybersecurity Riser Diagram	Contractor is required to provide a copy of a riser diagram in one-line format overlayed on a facility schematic as part of the final CYBERSECURITY DOCUMENTATION which defines the authorization boundary for the system. The organization is responsible to use this diagram as the supporting rationale to define within the security plan the security categorization of the system including upon final acceptance.
CCI-003116	SA-4(10)	The organization employs only information technology products on the FIPS 201-approved products list for Personal Identity Verification (PIV) capability implemented within organizational information systems.	Enclave Designer Impractical	FIPS 201-2 REQUIREMENT	Not Implemented and impractical. OT systems do not have the ability to accept PIV credentials and will require compensating controls. This CCI requires infrastructure support within the control system.
CCI-003124	SA-5(a)(1)	The organization obtains administrator documentation for the information system, system component, or information system services that describes secure configuration of the system, component, or service.	Designer Non-Designer	Control System Cybersecurity Documentation	This is met by requiring the contractor to provide all administrator documentation that describes secure configuration of the controller/device.
CCI-003125	SA-5(a)(1)	The organization obtains administrator documentation for the information system, system component, or information system services that describes secure installation of the system, component, or service.	Designer Non-Designer	Control System Cybersecurity Documentation	This is met by requiring the contractor to provide all administrator documentation that describes secure configuration of the controller/device, or or a specific indication that there are no secure configuration steps that apply as necessary.
CCI-003126	SA-5(a)(1)	The organization obtains administrator documentation for the information system, system component, or information system services that describes secure operation of the system, component, or service.	Designer Non-Designer	Control System Cybersecurity Documentation	This is met by requiring the contractor to provide all administrator documentation that describes secure operation of the controller/device, or or a specific indication that there are no secure configuration steps that apply as necessary.
CCI-003127	SA-5(a)(2)	The organization obtains administrator documentation for the information system, system component, or information system services that describes effective use and maintenance of security functions/mechanisms.	Designer Non-Designer	Control System Cybersecurity Documentation	This is met by requiring the contractor to provide all administrator documentation that describes effective use and maintenance of security functions or mechanisms for the controller/device, or a specific indication that there are no security functions or mechanisms in the device as necessary.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-003128	SA-5(a)(3)	The organization obtains administrator documentation for the information system, system component, or information system services that describes known vulnerabilities regarding configuration and use of administrative (i.e. privileged) functions.	Designer Non-Designer	Control System Cybersecurity Documentation	This is met by requiring the contractor to provide all administrator documentation that describes known vulnerabilities regarding configuration and use of administrative (i.e. privileged) functions for the device.
CCI-003129	SA-5(b)(1)	The organization obtains user documentation for the information system, system component, or information system service that describes user-accessible security functions/mechanisms and how to effectively use those security functions/mechanisms.	Designer Non-Designer	Control System Cybersecurity Documentation	This is met by requiring the contractor to provide documentation that describes user-accessible security functions or mechanisms in the device and how to effectively use those security functions or mechanisms; or a specific indication that there are no user-accessible security functions or mechanisms in the device.
CCI-003130	SA-5(b)(2)	The organization obtains user documentation for the information system, system component or information system service that describes methods for user interaction which enables individuals to use the system, component, or service in a more secure manner.	Designer Non-Designer	Control System Cybersecurity Documentation	This is met by requiring the contractor must provide documentation that describes methods for user interaction which enables individuals to use the device in a more secure manner.
CCI-003131	SA-5(b)(3)	The organization obtains user documentation for the information system, system component or information system service that describes user responsibilities in maintaining the security of the system, component, or service.	Designer Non-Designer	Control System Cybersecurity Documentation	This is met by requiring the contractor must provide documentation that describes methods for user interaction which enables individuals to use the device in a more secure manner.

Starting Control Set and Tailoring Recommendations

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
AC-1	ACCESS CONTROL POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. An access control policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the access control policy and associated access controls; and b. Reviews and updates the current: 1. Access control policy [Assignment: organization-defined frequency]; and 2. Access control procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-2	ACCOUNT MANAGEMENT	The organization: a. Identifies and selects the following types of information system accounts to support organizational missions/business functions: [Assignment: organization-defined information system account types]; b. Assigns account managers for information system accounts; c. Establishes conditions for group and role membership; d. Specifies authorized users of the information system, group and role membership, and access authorizations (i.e., privileges) and other attributes (as required) for each account; e. Requires approvals by [Assignment: organization-defined personnel or roles] for requests to create information system accounts; f. Creates, enables, modifies, disables, and removes information system accounts in accordance with [Assignment: organization-defined procedures or conditions]; g. Monitors the use of information system accounts; h. Notifies account managers: 1. When accounts are no longer required; 2. When users are terminated or transferred; and 3. When individual information system usage or need-to-know changes; i. Authorizes access to the information system based on: 1. A valid access authorization; 2. Intended system usage; and 3. Other attributes as required by the organization or associated missions/business functions; j. Reviews accounts for compliance with account management requirements [Assignment: organization-defined frequency]; and k. Establishes a process for reissuing shared/group account credentials (if deployed) when individuals are removed from the group.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-2(1)	ACCOUNT MANAGEMENT | AUTOMATED SYSTEM ACCOUNT MANAGEMENT	The organization employs automated mechanisms to support the management of information system accounts.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-2(2)	ACCOUNT MANAGEMENT | REMOVAL OF TEMPORARY / EMERGENCY ACCOUNTS	The information system automatically [Selection: removes; disables] temporary and emergency accounts after [Assignment: organization-defined time period for each type of account].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-2(3)	ACCOUNT MANAGEMENT | DISABLE INACTIVE ACCOUNTS	The information system automatically disables inactive accounts after [Assignment: organization-defined time period].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-2(4)	ACCOUNT MANAGEMENT | AUTOMATED AUDIT ACTIONS	The information system automatically audits account creation, modification, enabling, disabling, and removal actions, and notifies [Assignment: organization-defined personnel or roles].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-2(5)	ACCOUNT MANAGEMENT | INACTIVITY LOGOUT	The organization requires that users log out when [Assignment: organization-defined time-period of expected inactivity or description of when to log out].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-2(7)	ACCOUNT MANAGEMENT | ROLE-BASED SCHEMES	The organization: (a) Establishes and administers privileged user accounts in accordance with a role-based access scheme that organizes allowed information system access and privileges into roles; (b) Monitors privileged role assignments; and (c) Takes [Assignment: organization-defined actions] when privileged role assignments are no longer appropriate.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-2(9)	ACCOUNT MANAGEMENT | RESTRICTIONS ON USE OF SHARED GROUPS / ACCOUNTS	The organization only permits the use of shared/group accounts that meet [Assignment: organization-defined conditions for establishing shared/group accounts].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-2(10)	ACCOUNT MANAGEMENT | SHARED / GROUP ACCOUNT CREDENTIAL TERMINATION	The information system terminates shared/group account credentials when members leave the group.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-2(12)	ACCOUNT MANAGEMENT | ACCOUNT MONITORING / ATYPICAL USAGE	The organization: (a) Monitors information system accounts for [Assignment: organization-defined atypical use]; and (b) Reports atypical usage of information system accounts to [Assignment: organization-defined personnel or roles].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-2(13)	ACCOUNT MANAGEMENT | DISABLE ACCOUNTS FOR HIGH-RISK INDIVIDUALS	The organization disables accounts of users posing a significant risk within [Assignment: organization-defined time period] of discovery of the risk.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-3	ACCESS ENFORCEMENT	The information system enforces approved authorizations for logical access to information and system resources in accordance with applicable access control policies.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-3(4)	ACCESS ENFORCEMENT | DISCRETIONARY ACCESS CONTROL	The information system enforces [Assignment: organization-defined discretionary access control policies] over defined subjects and objects where the policy specifies that a subject that has been granted access to information can do one or more of the following: (a) Pass the information to any other subjects or objects; (b) Grant its privileges to other subjects; (c) Change security attributes on subjects, objects, the information system, or the information system's components; (d) Choose the security attributes to be associated with newly created or revised objects; or (e) Change the rules governing access control.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
AC-4	INFORMATION FLOW ENFORCEMENT	The information system enforces approved authorizations for controlling the flow of information within the system and between interconnected systems based on [Assignment: organization-defined information flow control policies].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-5	SEPARATION OF DUTIES	The organization: a. Separates [Assignment: organization-defined duties of individuals]; b. Documents separation of duties of individuals; and c. Defines information system access authorizations to support separation of duties.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-6	LEAST PRIVILEGE	The organization employs the concept of least privilege, allowing only authorized accesses for users (and processes acting on behalf of users) which are necessary to accomplish assigned tasks in accordance with organizational missions and business functions.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-6(1)	LEAST PRIVILEGE | AUTHORIZE ACCESS TO SECURITY FUNCTIONS	The organization explicitly authorizes access to [Assignment: organization-defined security functions (deployed in hardware, software, and firmware) and security-relevant information].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-6(2)	LEAST PRIVILEGE | NON-PRIVILEGED ACCESS FOR NONSECURITY FUNCTIONS	The organization requires that users of information system accounts, or roles, with access to [Assignment: organization-defined security functions or security-relevant information], use non-privileged accounts or roles, when accessing nonsecurity functions.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-6(5)	LEAST PRIVILEGE | PRIVILEGED ACCOUNTS	The organization restricts privileged accounts on the information system to [Assignment: organization-defined personnel or roles].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-6(7)	LEAST PRIVILEGE | REVIEW OF USER PRIVILEGES	The organization: (a) Reviews [Assignment: organization-defined frequency] the privileges assigned to [Assignment: organization-defined roles or classes of users] to validate the need for such privileges; and (b) Reassigns or removes privileges, if necessary, to correctly reflect organizational mission/business needs.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-6(8)	LEAST PRIVILEGE | PRIVILEGE LEVELS FOR CODE EXECUTION	The information system prevents [Assignment: organization-defined software] from executing at higher privilege levels than users executing the software.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-6(9)	LEAST PRIVILEGE | AUDITING USE OF PRIVILEGED FUNCTIONS	The information system audits the execution of privileged functions.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-6(10)	LEAST PRIVILEGE | PROHIBIT NON-PRIVILEGED USERS FROM EXECUTING PRIVILEGED FUNCTIONS	The information system prevents non-privileged users from executing privileged functions to include disabling, circumventing, or altering implemented security safeguards/countermeasures.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-7	UNSUCCESSFUL LOGIN ATTEMPTS	The information system: a. Enforces a limit of [Assignment: organization-defined number] consecutive invalid logon attempts by a user during a [Assignment: organization-defined time period]; and b. Automatically [Selection: locks the account/node for an [Assignment: organization-defined time period]; locks the account/node until released by an administrator; delays next logon prompt according to [Assignment: organization-defined delay algorithm]] when the maximum number of unsuccessful attempts is exceeded.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-8	SYSTEM USE NOTIFICATION	The information system: a. Displays to users [Assignment: organization-defined system use notification message or banner] before granting access to the system that provides privacy and security notices consistent with applicable federal laws, Executive Orders, directives, policies, regulations, standards, and guidance and states that: 1. Users are accessing a U.S. Government information system; 2. Information system usage may be monitored, recorded, and subject to audit; 3. Unauthorized use of the information system is prohibited and subject to criminal and civil penalties; and 4. Use of the information system indicates consent to monitoring and recording; b. Retains the notification message or banner on the screen until users acknowledge the usage conditions and take explicit actions to log on to or further access the information system; and c. For publicly accessible systems: 1. Displays system use information [Assignment: organization-defined conditions], before granting further access; 2. Displays references, if any, to monitoring, recording, or auditing that are consistent with privacy accommodations for such systems that generally prohibit those activities; and 3. Includes a description of the authorized uses of the system.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-10	CONCURRENT SESSION CONTROL	The information system limits the number of concurrent sessions for each [Assignment: organization-defined account and/or account type] to [Assignment: organization-defined number].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-11	SESSION LOCK	The information system: a. Prevents further access to the system by initiating a session lock after [Assignment: organization-defined time period] of inactivity or upon receiving a request from a user; and b. Retains the session lock until the user reestablishes access using established identification and authentication procedures.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-12	SESSION TERMINATION	The information system automatically terminates a user session after [Assignment: organization-defined conditions or trigger events requiring session disconnect].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-14	PERMITTED ACTIONS WITHOUT IDENTIFICATION OR AUTHENTICATION	The organization: a. Identifies [Assignment: organization-defined user actions] that can be performed on the information system without identification or authentication consistent with organizational missions/business functions; and b. Documents and provides supporting rationale in the security plan for the information system, user actions not requiring identification or authentication.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
AC-16	SECURITY ATTRIBUTES	The organization: a. Provides the means to associate [Assignment: organization-defined types of security attributes] having [Assignment: organization-defined security attribute values] with information in storage, in process, and/or in transmission; b. Ensures that the security attribute associations are made and retained with the information; c. Establishes the permitted [Assignment: organization-defined security attributes] for [Assignment: organization-defined information systems]; and d. Determines the permitted [Assignment: organization-defined values or ranges] for each of the established security attributes.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-16(6)	SECURITY ATTRIBUTES | MAINTENANCE OF ATTRIBUTE ASSOCIATION BY ORGANIZATION	The organization allows personnel to associate, and maintain the association of [Assignment: organization-defined security attributes] with [Assignment: organization-defined subjects and objects] in accordance with [Assignment: organization-defined security policies].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-17	REMOTE ACCESS	The organization: a. Establishes and documents usage restrictions, configuration/connection requirements, and implementation guidance for each type of remote access allowed; and b. Authorizes remote access to the information system prior to allowing such connections.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-17(1)	REMOTE ACCESS | AUTOMATED MONITORING / CONTROL	The information system monitors and controls remote access methods.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-17(2)	REMOTE ACCESS | PROTECTION OF CONFIDENTIALITY / INTEGRITY USING ENCRYPTION	The information system implements cryptographic mechanisms to protect the confidentiality and integrity of remote access sessions.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-17(3)	REMOTE ACCESS | MANAGED ACCESS CONTROL POINTS	The information system routes all remote accesses through [Assignment: organization-defined number] managed network access control points.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-17(4)	REMOTE ACCESS | PRIVILEGED COMMANDS/ ACCESS	The organization: (a) Authorizes the execution of privileged commands and access to security-relevant information via remote access only for [Assignment: organization-defined needs]; and (b) Documents the rationale for such access in the security plan for the information system.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-17(9)	REMOTE ACCESS | DISCONNECT/ DISABLE ACCESS	The organization provides the capability to expeditiously disconnect or disable remote access to the information system within [Assignment: organization-defined time period].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-18	WIRELESS ACCESS	The organization: a. Establishes usage restrictions, configuration/connection requirements, and implementation guidance for wireless access; and b. Authorizes wireless access to the information system prior to allowing such connections.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-18(1)	WIRELESS ACCESS | AUTHENTICATION AND ENCRYPTION	The information system protects wireless access to the system using authentication of [Selection (one or more): users; devices] and encryption.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-18(3)	WIRELESS ACCESS | DISABLE WIRELESS NETWORKING	The organization disables, when not intended for use, wireless networking capabilities internally embedded within information system components prior to issuance and deployment.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-18(4)	WIRELESS ACCESS | RESTRICT CONFIGURATIONS BY USERS	The organization identifies and explicitly authorizes users allowed to independently configure wireless networking capabilities.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-19	ACCESS CONTROL FOR MOBILE DEVICES	The organization: a. Establishes usage restrictions, configuration requirements, connection requirements, and implementation guidance for organization-controlled mobile devices; and b. Authorizes the connection of mobile devices to organizational information systems.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-19(5)	ACCESS CONTROL FOR MOBILE DEVICES | FULL DEVICE/ CONTAINER-BASED ENCRYPTION	The organization employs [Selection: full-device encryption; container encryption] to protect the confidentiality and integrity of information on [Assignment: organization-defined mobile devices].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-20	USE OF EXTERNAL INFORMATION SYSTEMS	The organization establishes terms and conditions, consistent with any trust relationships established with other organizations owning, operating, and/or maintaining external information systems, allowing authorized individuals to: a. Access the information system from external information systems; and b. Process, store, or transmit organization-controlled information using external information systems.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-20(1)	USE OF EXTERNAL INFORMATION SYSTEMS | LIMITS ON AUTHORIZED USE	The organization permits authorized individuals to use an external information system to access the information system or to process, store, or transmit organization-controlled information only when the organization: (a) Verifies the implementation of required security controls on the external system as specified in the organization's information security policy and security plan; or (b) Retains approved information system connection or processing agreements with the organizational entity hosting the external information system.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-20(3)	USE OF EXTERNAL INFORMATION SYSTEMS | NON-ORGANIZATIONALLY OWNED SYSTEMS / COMPONENTS / DEVICES	The organization [Selection: restricts; prohibits] the use of non-organizationally owned information systems, system components, or devices to process, store, or transmit organizational information.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AC-21	INFORMATION SHARING	The organization: a. Facilitates information sharing by enabling authorized users to determine whether access authorizations assigned to the sharing partner match the access restrictions on the information for [Assignment: organization-defined information sharing circumstances where user discretion is required]; and b. Employs [Assignment: organization-defined automated mechanisms or manual processes] to assist users in making information sharing/collaboration decisions.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
AC-22	PUBLICLY ACCESSIBLE CONTENT	The organization: a. Designates individuals authorized to post information onto a publicly accessible information system; b. Trains authorized individuals to ensure that publicly accessible information does not contain nonpublic information; c. Reviews the proposed content of information prior to posting onto the publicly accessible information system to ensure that nonpublic information is not included; and d. Reviews the content on the publicly accessible information system for nonpublic information [Assignment: organization-defined frequency] and removes such information, if discovered.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AT-1	SECURITY AWARENESS AND TRAINING POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A security awareness and training policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the security awareness and training policy and associated security awareness and training controls; and b. Reviews and updates the current: 1. Security awareness and training policy [Assignment: organization-defined frequency]; and 2. Security awareness and training procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AT-2	SECURITY AWARENESS TRAINING	The organization provides basic security awareness training to information system users (including managers, senior executives, and contractors): a. As part of initial training for new users; b. When required by information system changes; and c. [Assignment: organization-defined frequency] thereafter.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AT-2(2)	SECURITY AWARENESS | INSIDER THREAT	The organization includes security awareness training on recognizing and reporting potential indicators of insider threat.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AT-3	ROLE-BASED SECURITY TRAINING	The organization provides role-based security training to personnel with assigned security roles and responsibilities: a. Before authorizing access to the information system or performing assigned duties; b. When required by information system changes; and c. [Assignment: organization-defined frequency] thereafter.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AT-3(2)	SECURITY TRAINING | PHYSICAL SECURITY CONTROLS	The organization provides [Assignment: organization-defined personnel or roles] with initial and [Assignment: organization-defined frequency] training in the employment and operation of physical security controls.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AT-3(4)	SECURITY TRAINING | SUSPICIOUS COMMUNICATIONS AND ANOMALOUS SYSTEM BEHAVIOR	The organization provides training to its personnel on [Assignment: organization-defined indicators of malicious code] to recognize suspicious communications and anomalous behavior in organizational information systems.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AT-4	SECURITY TRAINING RECORDS	The organization: a. Documents and monitors individual information system security training activities including basic security awareness training and specific information system security training; and b. Retains individual training records for [Assignment: organization-defined time period].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AU-1	AUDIT AND ACCOUNTABILITY POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. An audit and accountability policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the audit and accountability policy and associated audit and accountability controls; and b. Reviews and updates the current: 1. Audit and accountability policy [Assignment: organization-defined frequency]; and 2. Audit and accountability procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AU-2	AUDIT EVENTS	The organization: a. Determines that the information system is capable of auditing the following events: [Assignment: organization-defined auditable events]; b. Coordinates the security audit function with other organizational entities requiring audit-related information to enhance mutual support and to help guide the selection of auditable events; c. Provides a rationale for why the auditable events are deemed to be adequate to support after-the-fact investigations of security incidents; and d. Determines that the following events are to be audited within the information system: [Assignment: organization-defined audited events (the subset of the auditable events defined in AU-2 a.) along with the frequency of (or situation requiring) auditing for each identified event].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AU-2(3)	AUDIT EVENTS | REVIEWS AND UPDATES	The organization reviews and updates the audited events [Assignment: organization-defined frequency].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AU-3	CONTENT OF AUDIT RECORDS	The information system generates audit records containing information that establishes what type of event occurred, when the event occurred, where the event occurred, the source of the event, the outcome of the event, and the identity of any individuals or subjects associated with the event.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AU-3(1)	CONTENT OF AUDIT RECORDS | ADDITIONAL AUDIT INFORMATION	The information system generates audit records containing the following additional information: [Assignment: organization-defined additional, more detailed information].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AU-4	AUDIT STORAGE CAPACITY	The organization allocates audit record storage capacity in accordance with [Assignment: organization-defined audit record storage requirements].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AU-4(1)	AUDIT STORAGE CAPACITY | TRANSFER TO ALTERNATE STORAGE	The information system off-loads audit records [Assignment: organization-defined frequency] onto a different system or media than the system being audited.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
AU-5	RESPONSE TO AUDIT PROCESSING FAILURES	The information system: a. Alerts [Assignment: organization-defined personnel or roles] in the event of an audit processing failure; and b. Takes the following additional actions: [Assignment: organization-defined actions to be taken (e.g., shut down information system, overwrite oldest audit records, stop generating audit records)].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AU-5(1)	RESPONSE TO AUDIT PROCESSING FAILURES | AUDIT STORAGE CAPACITY	The information system provides a warning to [Assignment: organization-defined personnel, roles, and/or locations] within [Assignment: organization-defined time period] when allocated audit record storage volume reaches [Assignment: organi zation-defined percentage] of repository maximum audit record storage capacity.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AU-6	AUDIT REVIEW, ANALYSIS, AND REPORTING	The organization: a. Reviews and analyzes information system audit records [Assignment: organization-defined frequency] for indications of [Assignment: organization-defined inappropriate or unusual activity]; and b. Reports findings to [Assignment: organization-defined personnel or roles].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AU-6(1)	AUDIT REVIEW, ANALYSIS, AND REPORTING | PROCESS INTEGRATION	The organization employs automated mechanisms to integrate audit review, analysis, and reporting processes to support organizational processes for investigation and response to suspicious activities.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AU-6(3)	AUDIT REVIEW, ANALYSIS, AND REPORTING | CORRELATE AUDIT REPOSITORIES	The organization analyzes and correlates audit records across different repositories to gain organization-wide situational awareness.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AU-6(4)	AUDIT REVIEW, ANALYSIS, AND REPORTING | CENTRAL REVIEW AND ANALYSIS	The information system provides the capability to centrally review and analyze audit records from multiple components within the system.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AU-6(10)	AUDIT REVIEW, ANALYSIS, AND REPORTING | AUDIT LEVEL ADJUSTMENT	The organization adjusts the level of audit review, analysis, and reporting within the information system when there is a change in risk based on law enforcement information, intelligence information, or other credible sources of information.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AU-7	AUDIT REDUCTION AND REPORT GENERATION	The information system provides an audit reduction and report generation capability that: a. Supports on-demand audit review, analysis, and reporting requirements and after-the-fact investigations of security incidents; and b. Does not alter the original content or time ordering of audit records.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AU-7(1)	AUDIT REDUCTION AND REPORT GENERATION | AUTOMATIC PROCESSING	The information system provides the capability to process audit records for events of interest based on [Assignment: organization-defined audit fields within audit records].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AU-8	TIME STAMPS	The information system: a. Uses internal system clocks to generate time stamps for audit records; and b. Records time stamps for audit records that can be mapped to Coordinated Universal Time (UTC) or Greenwich Mean Time (GMT) and meets [Assignment: organization-defined granularity of time measurement].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AU-8(1)	TIME STAMPS | SYNCHRONIZATION WITH AUTHORITATIVE TIME SOURCE	The information system: (a) Compares the internal information system clocks [Assignment: organization-defined frequency] with [Assignment: organization-defined authoritative time source]; and (b) Synchronizes the internal system clocks to the authoritative time source when the time difference is greater than [Assignment: organization-defined time period].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AU-9	PROTECTION OF AUDIT INFORMATION	The information system protects audit information and audit tools from unauthorized access, modification, and deletion.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AU-9(4)	PROTECTION OF AUDIT INFORMATION | ACCESS BY SUBSET OF PRIVILEGED USERS	The organization authorizes access to management of audit functionality to only [Assignment: organization-defined subset of privileged users].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AU-10	NON-REPUDIATION	The information system protects against an individual (or process acting on behalf of an individual) falsely denying having performed [Assignment: organization-defined actions to be covered by non-repudiation].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AU-11	AUDIT RECORD RETENTION	The organization retains audit records for [Assignment: organization-defined time period consistent with records retention policy] to provide support for after-the-fact investigations of security incidents and to meet regulatory and organizational information retention requirements.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AU-11(1)	AUDIT RECORD RETENTION | LONG-TERM RETRIEVAL CAPABILITY	The organization employs [Assignment: organization-defined measures] to ensure that long-term audit records generated by the information system can be retrieved.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AU-12	AUDIT GENERATION	The information system: a. Provides audit record generation capability for the auditable events defined in AU-2 at [Assignment: organization-defined information system components]; b. Allows [Assignment: organization-defined personnel or roles] to select which auditable events are to be audited by specific components of the information system; and c. Generates audit records for the audited events defined in AU-2 with the content defined in AU-3.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AU-12(1)	AUDIT GENERATION | SYSTEM-WIDE / TIME-CORRELATED AUDIT TRAIL	The information system compiles audit records from [Assignment: organization-defined information system components] into a system-wide (logical or physical) audit trail that is time-correlated to within [Assignment: organization-defined level of tolerance for relationship between time stamps of individual records in the audit trail].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AU-12(3)	AUDIT GENERATION | CHANGES BY AUTHORIZED INDIVIDUALS	The information system provides the capability for [Assignment: organization-defined individuals or roles] to change the auditing to be performed on [Assignment: organization-defined information system components] based on [Assignment: organization-defined selectable event criteria] within [Assignment: organization-defined time thresholds].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AU-14	SESSION AUDIT	The information system provides the capability for authorized users to select a user session to capture/record or view/hear.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
AU-14(1)	SESSION AUDIT | SYSTEM START-UP	The information system initiates session audits at system start-up.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
AU-14(2)	SESSION AUDIT | CAPTURE/RECORD AND LOG CONTENT	The information system provides the capability for authorized users to capture/record and log content related to a user session.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CA-1	SECURITY ASSESSMENT AND AUTHORIZATION POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A security assessment and authorization policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the security assessment and authorization policy and associated security assessment and authorization controls; and b. Reviews and updates the current: 1. Security assessment and authorization policy [Assignment: organization-defined frequency]; and 2. Security assessment and authorization procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CA-2	SECURITY ASSESSMENTS	The organization: a. Develops a security assessment plan that describes the scope of the assessment including: 1. Security controls and control enhancements under assessment; 2. Assessment procedures to be used to determine security control effectiveness; and 3. Assessment environment, assessment team, and assessment roles and responsibilities; b. Assesses the security controls in the information system and its environment of operation [Assignment: organization-defined frequency] to determine the extent to which the controls are implemented correctly, operating as intended, and producing the desired outcome with respect to meeting established security requirements; c. Produces a security assessment report that documents the results of the assessment; and d. Provides the results of the security control assessment to [Assignment: organization-defined individuals or roles].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CA-2(1)	SECURITY ASSESSMENTS | INDEPENDENT ASSESSORS	The organization employs assessors or assessment teams with [Assignment: organization-defined level of independence] to conduct security control assessments.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CA-3	SYSTEM INTERCONNECTIONS	The organization: a. Authorizes connections from the information system to other information systems through the use of Interconnection Security Agreements; b. Documents, for each interconnection, the interface characteristics, security requirements, and the nature of the information communicated; and c. Reviews and updates Interconnection Security Agreements [Assignment: organization-defined frequency].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CA-3(5)	SYSTEM INTERCONNECTIONS | RESTRICTIONS ON EXTERNAL SYSTEM CONNECTIONS	The organization employs [Selection: allow-all, deny-by-exception; deny-all, permit-by-exception] policy for allowing [Assignment: organization-defined information systems] to connect to external information systems.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CA-5	PLAN OF ACTION AND MILESTONES	The organization: a. Develops a plan of action and milestones for the information system to document the organization's planned remedial actions to correct weaknesses or deficiencies noted during the assessment of the security controls and to reduce or eliminate known vulnerabilities in the system; and b. Updates existing plan of action and milestones [Assignment: organization-defined frequency] based on the findings from security controls assessments, security impact analyses, and continuous monitoring activities.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CA-6	SECURITY AUTHORIZATION	The organization: a. Assigns a senior-level executive or manager as the authorizing official for the information system; b. Ensures that the authorizing official authorizes the information system for processing before commencing operations; and c. Updates the security authorization [Assignment: organization - defined frequency].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CA-7	CONTINUOUS MONITORING	The organization develops a continuous monitoring strategy and implements a continuous monitoring program that includes: a. Establishment of [Assignment: organization-defined metrics] to be monitored; b. Establishment of [Assignment: organization-defined frequencies] for monitoring and [Assignment: organization-defined frequencies] for assessments supporting such monitoring; c. Ongoing security control assessments in accordance with the organizational continuous monitoring strategy; d. Ongoing security status monitoring of organization-defined metrics in accordance with the organizational continuous monitoring strategy; e. Correlation and analysis of security-related information generated by assessments and monitoring; f. Response actions to address results of the analysis of security-related information; and g. Reporting the security status of organization and the information system to [Assignment: organization-defined personnel or roles] [Assignment: organization-defined frequency].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CA-7(1)	CONTINUOUS MONITORING | INDEPENDENT ASSESSMENT	The organization employs assessors or assessment teams with [Assignment: organization-defined level of independence] to monitor the security controls in the information system on an ongoing basis.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CA-9	INTERNAL SYSTEM CONNECTIONS	The organization: a. Authorizes internal connections of [Assignment: organization-defined information system components or classes of components] to the information system; and b. Documents, for each internal connection, the interface characteristics, security requirements, and the nature of the information communicated.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
CM-1	CONFIGURATION MANAGEMENT POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A configuration management policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the configuration management policy and associated configuration management controls; and b. Reviews and updates the current: 1. Configuration management policy [Assignment: organization-defined frequency]; and 2. Configuration management procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CM-2	BASELINE CONFIGURATION	The organization develops, documents, and maintains under configuration control, a current baseline configuration of the information system.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CM-2(1)	BASELINE CONFIGURATION | REVIEWS AND UPDATES	The organization reviews and updates the baseline configuration of the information system: (a) [Assignment: organization-defined frequency]; (b) When required due to [Assignment organization-defined circumstances]; and (c) As an integral part of information system component installations and upgrades.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CM-2(3)	BASELINE CONFIGURATION | RETENTION OF PREVIOUS CONFIGURATIONS	The organization retains [Assignment: organization-defined previous versions of baseline configurations of the information system] to support rollback.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CM-2(7)	BASELINE CONFIGURATION | CONFIGURE SYSTEMS, COMPONENTS, OR DEVICES FOR HIGH-RISK AREAS	The organization: (a) Issues [Assignment: organization-defined information systems, system components, or devices] with [Assignment: organization-defined configurations] to individuals traveling to locations that the organization deems to be of significant risk; and (b) Applies [Assignment: organization-defined security safeguards] to the devices when the individuals return.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CM-3	CONFIGURATION CHANGE CONTROL	The organization: a. Determines the types of changes to the information system that are configuration-controlled; b. Reviews proposed configuration-controlled changes to the information system and approves or disapproves such changes with explicit consideration for security impact analyses; c. Documents configuration change decisions associated with the information system; d. Implements approved configuration-controlled changes to the information system; e. Retains records of configuration-controlled changes to the information system for [Assignment: organization-defined time period]; f. Audits and reviews activities associated with configuration-controlled changes to the information system; and g. Coordinates and provides oversight for configuration change control activities through [Assignment: organization-defined configuration change control element (e.g., committee, board)] that convenes [Selection (one or more): [Assignment: organization-defined frequency]; [Assignment: organization-defined configuration change conditions]].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CM-3(2)	CONFIGURATION CHANGE CONTROL | TEST / VALIDATE / DOCUMENT CHANGES	The organization tests, validates, and documents changes to the information system before implementing the changes on the operational system.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CM-3(4)	CONFIGURATION CHANGE CONTROL | SECURITY REPRESENTATIVE	The organization requires an information security representative to be a member of the [Assignment: organization-defined configuration change control element].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CM-3(6)	CONFIGURATION CHANGE CONTROL | CRYPTOGRAPHY MANAGEMENT	The organization ensures that cryptographic mechanisms used to provide [Assignment: organization-defined security safeguards] are under configuration management.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CM-4	SECURITY IMPACT ANALYSIS	The organization analyzes changes to the information system to determine potential security impacts prior to change implementation.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CM-4(1)	SECURITY IMPACT ANALYSIS | SEPARATE TEST ENVIRONMENTS	The organization analyzes changes to the information system in a separate test environment before implementation in an operational environment, looking for security impacts due to flaws, weaknesses, incompatibility, or intentional malice.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CM-5	ACCESS RESTRICTIONS FOR CHANGE	The organization defines, documents, approves, and enforces physical and logical access restrictions associated with changes to the information system.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CM-5(1)	ACCESS RESTRICTIONS FOR CHANGE | AUTOMATED ACCESS ENFORCEMENT / AUDITING	The information system enforces access restrictions and supports auditing of the enforcement actions.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CM-5(2)	ACCESS RESTRICTIONS FOR CHANGE | REVIEW SYSTEM CHANGES	The organization reviews information system changes [Assignment: organization-defined frequency] and [Assignment: organization-defined circumstances] to determine whether unauthorized changes have occurred.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CM-5(5)	ACCESS RESTRICTIONS FOR CHANGE | LIMIT PRODUCTION / OPERATIONAL PRIVILEGES	The organization: (a) Limits privileges to change information system components and system-related information within a production or operational environment; and (b) Reviews and reevaluates privileges [Assignment: organization-defined frequency].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CM-5(6)	ACCESS RESTRICTIONS FOR CHANGE | LIMIT LIBRARY PRIVILEGES	The organization limits privileges to change software resident within software libraries.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
CM-6	CONFIGURATION SETTINGS	The organization: a. Establishes and documents configuration settings for information technology products employed within the information system using [Assignment: organization-defined security configuration checklists] that reflect the most restrictive mode consistent with operational requirements; b. Implements the configuration settings; c. Identifies, documents, and approves any deviations from established configuration settings for [Assignment: organization - defined information system components] based on [Assignment: organization-defined operational requirements]; and d. Monitors and controls changes to the configuration settings in accordance with organizational policies and procedures.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CM-6(1)	CONFIGURATION SETTINGS | AUTOMATED CENTRAL MANAGEMENT / APPLICATION / VERIFICATION	The organization employs automated mechanisms to centrally manage, apply, and verify configuration settings for [Assignment: organization-defined information system components].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CM-7	LEAST FUNCTIONALITY	The organization: a. Configures the information system to provide only essential capabilities; and b. Prohibits or restricts the use of the following functions, ports, protocols, and/or services: [Assignment: organization-defined prohibited or restricted functions, ports, protocols, and/or services].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CM-7(1)	LEAST FUNCTIONALITY | PERIODIC REVIEW	The organization: (a) Reviews the information system [Assignment: organization-defined frequency] to identify unnecessary and/or nonsecure functions, ports, protocols, and services; and (b) Disables [Assignment: organization-defined functions, ports, protocols, and services within the information system deemed to be unnecessary and/or nonsecure].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CM-7(2)	LEAST FUNCTIONALITY | PREVENT PROGRAM EXECUTION	The information system prevents program execution in accordance with [Selection (one or more): [Assignment: organization-defined policies regarding software program usage and restrictions]; rules authorizing the terms and conditions of software program usage].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CM-7(3)	LEAST FUNCTIONALITY | REGISTRATION COMPLIANCE	The organization ensures compliance with [Assignment: organization-defined registration requirements for functions, ports, protocols, and services].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CM-7(5)	LEAST FUNCTIONALITY | AUTHORIZED SOFTWARE / WHITELISTING	The organization: (a) Identifies [Assignment: organization-defined software programs authorized to execute on the information system]; (b) Employs a deny-all, permit-by-exception policy to allow the execution of authorized software programs on the information system; and (c) Reviews and updates the list of authorized software programs [Assignment: organization- defined frequency].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CM-8	INFORMATION SYSTEM COMPONENT INVENTORY	The organization: a. Develops and documents an inventory of information system components that: 1. Accurately reflects the current information system; 2. Includes all components within the authorization boundary of the information system; 3. Is at the level of granularity deemed necessary for tracking and reporting; and 4. Includes [Assignment: organization-defined information deemed necessary to achieve effective information system component accountability]; and b. Reviews and updates the information system component inventory [Assignment: organization-defined frequency].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CM-8(1)	INFORMATION SYSTEM COMPONENT INVENTORY | UPDATES DURING INSTALLATIONS / REMOVALS	The organization updates the inventory of information system components as an integral part of component installations, removals, and information system updates.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CM-8(2)	INFORMATION SYSTEM COMPONENT INVENTORY | AUTOMATED MAINTENANCE	The organization employs automated mechanisms to help maintain an up-to-date, complete, accurate, and readily available inventory of information system components.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CM-8(3)	INFORMATION SYSTEM COMPONENT INVENTORY | AUTOMATED UNAUTHORIZED COMPONENT DETECTION	The organization: (a) Employs automated mechanisms [Assignment: organization-defined frequency] to detect the presence of unauthorized hardware, software, and firmware components within the information system; and (b) Takes the following actions when unauthorized components are detected: [Selection (one or more): disables network access by such components; isolates the components; notifies [Assignment: organization-defined personnel or roles]].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CM-8(5)	INFORMATION SYSTEM COMPONENT INVENTORY | NO DUPLICATE ACCOUNTING OF COMPONENTS	The organization verifies that all components within the authorization boundary of the information system are not duplicated in other information system component inventories.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CM-9	CONFIGURATION MANAGEMENT PLAN	The organization develops, documents, and implements a configuration management plan for the information system that: a. Addresses roles, responsibilities, and configuration management processes and procedures; b. Establishes a process for identifying configuration items throughout the system development life cycle and for managing the configuration of the configuration items; c. Defines the configuration items for the information system and places the configuration items under configuration management; and d. Protects the configuration management plan from unauthorized disclosure and modification.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CM-10	SOFTWARE USAGE RESTRICTIONS	The organization: a. Uses software and associated documentation in accordance with contract agreements and copyright laws; b. Tracks the use of software and associated documentation protected by quantity licenses to control copying and distribution; and c. Controls and documents the use of peer-to-peer file sharing technology to ensure that this capability is not used for the unauthorized distribution, display, performance, or reproduction of copyrighted work.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CM-10(1)	SOFTWARE USAGE RESTRICTIONS | OPEN SOURCE SOFTWARE	The organization establishes the following restrictions on the use of open source software: [Assignment: organization-defined restrictions].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
CM-11	USER-INSTALLED SOFTWARE	The organization: a. Establishes [Assignment: organization-defined policies] governing the installation of software by users; b. Enforces software installation policies through [Assignment: organization-defined methods]; and c. Monitors policy compliance at [Assignment: organization-defined frequency].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CM-11(2)	USER-INSTALLED SOFTWARE | PROHIBIT INSTALLATION WITHOUT PRIVILEGED STATUS	The information system prohibits user installation of software without explicit privileged status.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CP-1	CONTINGENCY PLANNING POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A contingency planning policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the contingency planning policy and associated contingency planning controls; and b. Reviews and updates the current: 1. Contingency planning policy [Assignment: organization-defined frequency]; and 2. Contingency planning procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CP-2	CONTINGENCY PLAN	The organization: a. Develops a contingency plan for the information system that: 1. Identifies essential missions and business functions and associated contingency requirements; 2. Provides recovery objectives, restoration priorities, and metrics; 3. Addresses contingency roles, responsibilities, assigned individuals with contact information; 4. Addresses maintaining essential missions and business functions despite an information system disruption, compromise, or failure; 5. Addresses eventual, full information system restoration without deterioration of the security safeguards originally planned and implemented; and 6. Is reviewed and approved by [Assignment: organization-defined personnel or roles]; b. Distributes copies of the contingency plan to [Assignment: organization-defined key contingency personnel (identified by name and/or by role) and organizational elements]; c. Coordinates contingency planning activities with incident handling activities; d. Reviews the contingency plan for the information system [Assignment: organization-defined frequency]; e. Updates the contingency plan to address changes to the organization, information system, or environment of operation and problems encountered during contingency plan implementation, execution, or testing; f. Communicates contingency plan changes to [Assignment: organization-defined key contingency personnel (identified by name and/or by role) and organizational elements]; and g. Protects the contingency plan from unauthorized disclosure and modification.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CP-2(1)	CONTINGENCY PLAN | COORDINATE WITH RELATED PLANS	The organization coordinates contingency plan development with organizational elements responsible for related plans.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CP-2(3)	CONTINGENCY PLAN | RESUME ESSENTIAL MISSIONS / BUSINESS FUNCTIONS	The organization plans for the resumption of essential missions and business functions within [Assignment: organization-defined time period] of contingency plan activation.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CP-2(8)	CONTINGENCY PLAN | IDENTIFY CRITICAL ASSETS	The organization identifies critical information system assets supporting essential missions and business functions.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CP-3	CONTINGENCY TRAINING	The organization provides contingency training to information system users consistent with assigned roles and responsibilities: a. Within [Assignment: organization-defined time period] of assuming a contingency role or responsibility; b. When required by information system changes; and c. [Assignment: organization-defined frequency] thereafter.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CP-4	CONTINGENCY PLAN TESTING	The organization: a. Tests the contingency plan for the information system [Assignment: organization-defined frequency] using [Assignment: organization-defined tests] to determine the effectiveness of the plan and the organizational readiness to execute the plan; b. Reviews the contingency plan test results; and c. Initiates corrective actions, if needed.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CP-4(1)	CONTINGENCY PLAN TESTING | COORDINATE WITH RELATED PLANS	The organization coordinates contingency plan testing with organizational elements responsible for related plans.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CP-6	ALTERNATE STORAGE SITE	The organization: a. Establishes an alternate storage site including necessary agreements to permit the storage and retrieval of information system backup information; and b. Ensures that the alternate storage site provides information security safeguards equivalent to that of the primary site.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CP-6(1)	ALTERNATE STORAGE SITE | SEPARATION FROM PRIMARY SITE	The organization identifies an alternate storage site that is separated from the primary storage site to reduce susceptibility to the same threats.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CP-6(3)	ALTERNATE STORAGE SITE | ACCESSIBILITY	The organization identifies potential accessibility problems to the alternate storage site in the event of an area-wide disruption or disaster and outlines explicit mitigation actions.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
CP-7	ALTERNATE PROCESSING SITE	The organization: a. Establishes an alternate processing site including necessary agreements to permit the transfer and resumption of [Assignment: organization-defined information system operations] for essential missions/business functions within [Assignment: organization-defined time period consistent with recovery time and recovery point objectives] when the primary processing capabilities are unavailable; b. Ensures that equipment and supplies required to transfer and resume operations are available at the alternate processing site or contracts are in place to support delivery to the site within the organization-defined time period for transfer/resumption; and c. Ensures that the alternate processing site provides information security safeguards equivalent to that of the primary site.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CP-7(1)	ALTERNATE PROCESSING SITE | SEPARATION FROM PRIMARY SITE	The organization identifies an alternate processing site that is separated from the primary processing site to reduce susceptibility to the same threats.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CP-7(2)	ALTERNATE PROCESSING SITE | ACCESSIBILITY	The organization identifies potential accessibility problems to the alternate processing site in the event of an area-wide disruption or disaster and outlines explicit mitigation actions.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CP-7(3)	ALTERNATE PROCESSING SITE | PRIORITY OF SERVICE	The organization develops alternate processing site agreements that contain priority-of-service provisions in accordance with the organization's availability requirements (including recovery time objectives).	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CP-8	TELECOMMUNICATIONS SERVICES	The organization establishes alternate telecommunications services including necessary agreements to permit the resumption of [Assignment: organization-defined information system operations] for essential missions and business functions within [Assignment: organization- defined time period] when the primary telecommunications capabilities are unavailable at either the primary or alternate processing or storage sites.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CP-8(1)	TELECOMMUNICATIONS SERVICES | PRIORITY OF SERVICE PROVISIONS	The organization: (a) Develops primary and alternate telecommunications service agreements that contain priority-of-service provisions in accordance with organizational availability requirements (including recovery time objectives); and (b) Requests Telecommunications Service Priority for all telecommunications services used for national security emergency preparedness in the event that the primary and/or alternate telecommunications services are provided by a common carrier.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CP-8(2)	TELECOMMUNICATIONS SERVICES | SINGLE POINTS OF FAILURE	The organization obtains alternate telecommunications services to reduce the likelihood of sharing a single point of failure with primary telecommunications services.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CP-9	INFORMATION SYSTEM BACKUP	The organization: a. Conducts backups of user-level information contained in the information system [Assignment: organization-defined frequency consistent with recovery time and recovery point objectives]; b. Conducts backups of system-level information contained in the information system [Assignment: organization-defined frequency consistent with recovery time and recovery point objectives]; c. Conducts backups of information system documentation including security-related documentation [Assignment: organization-defined frequency consistent with recovery time and recovery point objectives]; and d. Protects the confidentiality, integrity, and availability of backup information at storage locations.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CP-9(1)	INFORMATION SYSTEM BACKUP | TESTING FOR RELIABILITY / INTEGRITY	The organization tests backup information [Assignment: organization-defined frequency] to verify media reliability and information integrity.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CP-9(5)	INFORMATION SYSTEM BACKUP | TRANSFER TO ALTERNATE STORAGE SITE	The organization transfers information system backup information to the alternate storage site [Assignment: organization-defined time period and transfer rate consistent with the recovery time and recovery point objectives].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CP-10	INFORMATION SYSTEM RECOVERY AND RECONSTITUTION	The organization provides for the recovery and reconstitution of the information system to a known state after a disruption, compromise, or failure.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CP-10(2)	INFORMATION SYSTEM RECOVERY AND RECONSTITUTION | TRANSACTION RECOVERY	The information system implements transaction recovery for systems that are transaction-based.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
CP-12	SAFE MODE	The information system, when [Assignment:organization-defined conditions] are detected, enters a safe mode of operation with [Assignment: organization-defined restrictions of safe mode of operation].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IA-1	IDENTIFICATION AND AUTHENTICATION POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. An identification and authentication policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the identification and authentication policy and associated identification and authentication controls; and b. Reviews and updates the current: 1. Identification and authentication policy [Assignment: organization-defined frequency]; and 2. Identification and authentication procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IA-2	IDENTIFICATION AND AUTHENTICATION (ORGANIZATIONAL USERS)	The information system uniquely identifies and authenticates organizational users (or processes acting on behalf of organizational users).	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IA-2(1)	IDENTIFICATION AND AUTHENTICATION | NETWORK ACCESS TO PRIVILEGED ACCOUNTS	The information system implements multifactor authentication for network access to privileged accounts.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IA-2(2)	IDENTIFICATION AND AUTHENTICATION | NETWORK ACCESS TO NON-PRIVILEGED ACCOUNTS	The information system implements multifactor authentication for network access to non-privileged accounts.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.

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IA-2(3)	IDENTIFICATION AND AUTHENTICATION | LOCAL ACCESS TO PRIVILEGED ACCOUNTS	The information system implements multifactor authentication for local access to privileged accounts.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IA-2(4)	IDENTIFICATION AND AUTHENTICATION | LOCAL ACCESS TO NON-PRIVILEGED ACCOUNTS	The information system implements multifactor authentication for local access to non-privileged accounts.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IA-2(5)	IDENTIFICATION AND AUTHENTICATION | GROUP AUTHENTICATION	The organization requires individuals to be authenticated with an individual authenticator when a group authenticator is employed.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IA-2(8)	IDENTIFICATION AND AUTHENTICATION | NETWORK ACCESS TO PRIVILEGED ACCOUNTS - REPLAY RESISTANT	The information system implements replay-resistant authentication mechanisms for network access to privileged accounts.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IA-2(9)	IDENTIFICATION AND AUTHENTICATION | NETWORK ACCESS TO NON-PRIVILEGED ACCOUNTS - REPLAY RESISTANT	The information system implements replay-resistant authentication mechanisms for network access to non-privileged accounts.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IA-2(11)	IDENTIFICATION AND AUTHENTICATION | REMOTE ACCESS - SEPARATE DEVICE	The information system implements multifactor authentication for remote access to privileged and non-privileged accounts such that one of the factors is provided by a device separate from the system gaining access and the device meets [Assignment: organization-defined strength of mechanism requirements].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IA-2(12)	IDENTIFICATION AND AUTHENTICATION | ACCEPTANCE OF PIV CREDENTIALS	The information system accepts and electronically verifies Personal Identity Verification (PIV) credentials.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IA-3	DEVICE IDENTIFICATION AND AUTHENTICATION	The information system uniquely identifies and authenticates [Assignment: organization defined specific and/or types of devices] before establishing a [Selection (one or more): local; remote; network] connection.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IA-3(1)	DEVICE IDENTIFICATION AND AUTHENTICATION | CRYPTOGRAPHIC BIDIRECTIONAL AUTHENTICATION	The information system authenticates [Assignment: organization-defined specific devices and/or types of devices] before establishing [Selection (one or more): local; remote; network] connection using bidirectional authentication that is cryptographically based.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IA-3(4)	DEVICE IDENTIFICATION AND AUTHENTICATION | DEVICE ATTESTATION	The organization ensures that device identification and authentication based on attestation is handled by [Assignment: organization-defined configuration management process].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IA-4	IDENTIFIER MANAGEMENT	The organization manages information system identifiers by: a. Receiving authorization from [Assignment: organization-defined personnel] to assign an individual, group, role, or device identifier; b. Selecting an identifier that identifies an individual, group, role, or device; c. Assigning the identifier to the intended individual, group, role, or device; d. Preventing reuse of identifiers for [Assignment: organization-defined time period]; and e. Disabling the identifier after [Assignment: organization-defined time period of inactivity].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IA-4(4)	IDENTIFIER MANAGEMENT | IDENTIFY USER STATUS	The organization manages individual identifiers by uniquely identifying each individual as [Assignment: organization-defined characteristic identifying individual status].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IA-5	AUTHENTICATOR MANAGEMENT	The organization manages information system authenticators by: a. Verifying, as part of the initial authenticator distribution, the identity of the individual, group, role, or device receiving the authenticator; b. Establishing initial authenticator content for authenticators defined by the organization; c. Ensuring that authenticators have sufficient strength of mechanism for their intended use; d. Establishing and implementing administrative procedures for initial authenticator distribution, for lost/compromised or damaged authenticators, and for revoking authenticators; e. Changing default content of authenticators prior to information system installation; f. Establishing minimum and maximum lifetime restrictions and reuse conditions for authenticators; g. Changing/refreshing authenticators [Assignment: organization-defined time period by authenticator type]; h. Protecting authenticator content from unauthorized disclosure and modification; i. Requiring individuals to take, and having devices implement, specific security safeguards to protect authenticators; and j. Changing authenticators for group/role accounts when membership to those accounts changes.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IA-5(1)	AUTHENTICATOR MANAGEMENT | PASSWORD-BASED AUTHENTICATION	The information system, for password-based authentication: (a) Enforces minimum password complexity of [Assignment: organization-defined requirements for case sensitivity, number of characters, mix of upper-case letters, lower-case letters, numbers, and special characters, including minimum requirements for each type]; (b) Enforces at least the following number of changed characters when new passwords are created: [Assignment: organization-defined number]; (c) Stores and transmits only cryptographically-protected passwords; (d) Enforces password minimum and maximum lifetime restrictions of [Assignment: organization-defined numbers for lifetime minimum, lifetime maximum]; (e) Prohibits password reuse for [Assignment: organization-defined number] generations; and (f) Allows the use of a temporary password for system logons with an immediate change to a permanent password.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IA-5(2)	AUTHENTICATOR MANAGEMENT | PKI-BASED AUTHENTICATION	The information system, for PKI-based authentication: (a) Validates certifications by constructing and verifying a certification path to an accepted trust anchor including checking certificate status information; (b) Enforces authorized access to the corresponding private key; (c) Maps the authenticated identity to the account of the individual or group; and (d) Implements a local cache of revocation data to support path discovery and validation in case of inability to access revocation information via the network.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.

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IA-5(3)	AUTHENTICATOR MANAGEMENT | IN-PERSON OR TRUSTED THIRD-PARTY REGISTRATION	The organization requires that the registration process to receive [Assignment: organization-defined types of and/or specific authenticators] be conducted [Selection: in person; by a trusted third party] before [Assignment: organization-defined registration authority] with authorization by [Assignment: organization-defined personnel or roles].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IA-5(4)	AUTHENTICATOR MANAGEMENT | AUTOMATED SUPPORT FOR PASSWORD STRENGTH DETERMINATION	The organization employs automated tools to determine if password authenticators are sufficiently strong to satisfy [Assignment: organization-defined requirements].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IA-5(8)	AUTHENTICATOR MANAGEMENT | MULTIPLE INFORMATION SYSTEM ACCOUNTS	The organization implements [Assignment: organization-defined security safeguards] to manage the risk of compromise due to individuals having accounts on multiple information systems.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IA-5(11)	AUTHENTICATOR MANAGEMENT | HARDWARE TOKEN-BASED AUTHENTICATION	The information system, for hardware token-based authentication, employs mechanisms that satisfy [Assignment: organization-defined token quality requirements].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IA-5(13)	AUTHENTICATOR MANAGEMENT | EXPIRATION OF CACHED AUTHENTICATORS	The information system prohibits the use of cached authenticators after [Assignment: organization-defined time period].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IA-5(14)	AUTHENTICATOR MANAGEMENT | MANAGING CONTENT OF PKI TRUST STORES	The organization, for PKI-based authentication, employs a deliberate organization-wide methodology for managing the content of PKI trust stores installed across all platforms including networks, operating systems, browsers, and applications.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IA-6	AUTHENTICATOR FEEDBACK	The information system obscures feedback of authentication information during the authentication process to protect the information from possible exploitation/use by unauthorized individuals.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IA-7	CRYPTOGRAPHIC MODULE AUTHENTICATION	The information system implements mechanisms for authentication to a cryptographic module that meet the requirements of applicable federal laws, Executive Orders, directives, policies, regulations, standards, and guidance for such authentication.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IA-8	IDENTIFICATION AND AUTHENTICATION (NON-ORGANIZATIONAL USERS)	The information system uniquely identifies and authenticates non-organizational users (or processes acting on behalf of non-organizational users).	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IA-8(1)	IDENTIFICATION AND AUTHENTICATION | ACCEPTANCE OF PIV CREDENTIALS FROM OTHER AGENCIES	The information system accepts and electronically verifies Personal Identity Verification (PIV) credentials from other federal agencies.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IA-8(2)	IDENTIFICATION AND AUTHENTICATION | ACCEPTANCE OF THIRD-PARTY CREDENTIALS	The information system accepts only FICAM-approved third-party credentials.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IA-8(3)	IDENTIFICATION AND AUTHENTICATION | USE OF FICAM-APPROVED PRODUCTS	The organization employs only FICAM-approved information system components in [Assignment: organization-defined information systems] to accept third-party credentials.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IA-8(4)	IDENTIFICATION AND AUTHENTICATION | USE OF FICAM-ISSUED PROFILES	The information system conforms to FICAM-issued profiles.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IR-1	INCIDENT RESPONSE POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. An incident response policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the incident response policy and associated incident response controls; and b. Reviews and updates the current: 1. Incident response policy [Assignment: organization-defined frequency]; and 2. Incident response procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IR-2	INCIDENT RESPONSE TRAINING	The organization provides incident response training to information system users consistent with assigned roles and responsibilities: a. Within [Assignment: organization-defined time period] of assuming an incident response role or responsibility; b. When required by information system changes; and c. [Assignment: organization-defined frequency] thereafter.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IR-3	INCIDENT RESPONSE TESTING	The organization tests the incident response capability for the information system [Assignment: organization-defined frequency] using [Assignment: organization-defined tests] to determine the incident response effectiveness and documents the results.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IR-3(2)	INCIDENT RESPONSE TESTING | COORDINATION WITH RELATED PLANS	The organization coordinates incident response testing with organizational elements responsible for related plans.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IR-4	INCIDENT HANDLING	The organization: a. Implements an incident handling capability for security incidents that includes preparation, detection and analysis, containment, eradication, and recovery; b. Coordinates incident handling activities with contingency planning activities; and c. Incorporates lessons learned from ongoing incident handling activities into incident response procedures, training, and testing/exercises, and implements the resulting changes accordingly.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IR-4(1)	INCIDENT HANDLING | AUTOMATED INCIDENT HANDLING PROCESSES	The organization employs automated mechanisms to support the incident handling process.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IR-4(3)	INCIDENT HANDLING | CONTINUITY OF OPERATIONS	The organization identifies [Assignment: organization-defined classes of incidents] and [Assignment: organization-defined actions to take in response to classes of incidents] to ensure continuation of organizational missions and business functions.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IR-4(4)	INCIDENT HANDLING | INFORMATION CORRELATION	The organization correlates incident information and individual incident responses to achieve an organization-wide perspective on incident awareness and response.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
IR-4(6)	INCIDENT HANDLING | INSIDER THREATS - SPECIFIC CAPABILITIES	The organization implements incident handling capability for insider threats.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IR-4(7)	INCIDENT HANDLING | INSIDER THREATS - INTRA-ORGANIZATION COORDINATION	The organization coordinates incident handling capability for insider threats across [Assignment: organization-defined components or elements of the organization].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IR-4(8)	INCIDENT HANDLING | CORRELATION WITH EXTERNAL ORGANIZATIONS	The organization coordinates with [Assignment: organization-defined external organizations] to correlate and share [Assignment: organization-defined incident information] to achieve a crossorganization perspective on incident awareness and more effective incident responses.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IR-5	INCIDENTMONITORING	The organization tracks and documents information system security incidents.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IR-6	INCIDENT REPORTING	The organization: a. Requires personnel to report suspected security incidents to the organizational incident response capability within [Assignment: organization-defined time-period]; and b. Reports security incident information to [Assignment: organization-defined authorities].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IR-6(1)	INCIDENT REPORTING | AUTOMATED REPORTING	The organization employs automated mechanisms to assist in the reporting of security incidents.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IR-6(2)	INCIDENT REPORTING | VULNERABILITIES RELATED TO INCIDENTS	The organization reports information system vulnerabilities associated with reported security incidents to [Assignment: organization-defined personnel].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IR-7	INCIDENT RESPONSE ASSISTANCE	The organization provides an incident response support resource, integral to the organizational incident response capability, that offers advice and assistance to users of the information system for the handling and reporting of security incidents.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IR-7(1)	INCIDENT RESPONSE ASSISTANCE | AUTOMATION SUPPORT FOR AVAILABILITY OF INFORMATION / SUPPORT	The organization employs automated mechanisms to increase the availability of incident response related information and support.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IR-7(2)	INCIDENT RESPONSE ASSISTANCE | COORDINATION WITH EXTERNAL PROVIDERS	The organization: (a) Establishes a direct, cooperative relationship between its incident response capability and external providers of information system protection capability; and (b) Identifies organizational incident response team members to the external providers.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IR-8	INCIDENT RESPONSE PLAN	The organization: a. Develops an incident response plan that: 1. Provides the organization with a roadmap for implementing its incident response capability; 2. Describes the structure and organization of the incident response capability; 3. Provides a high-level approach for how the incident response capability fits into the overall organization; 4. Meets the unique requirements of the organization, which relate to mission, size, structure, and functions; 5. Defines reportable incidents; 6. Provides metrics for measuring the incident response capability within the organization; 7. Defines the resources and management support needed to effectively maintain and mature an incident response capability; and 8. Is reviewed and approved by [Assignment: organization-defined personnel or roles]; b. Distributes copies of the incident response plan to [Assignment: organization-defined incident response personnel (identified by name and/or by role) and organizational elements]; c. Reviews the incident response plan [Assignment: organization-defined frequency]; d. Updates the incident response plan to address system/organizational changes or problems encountered during plan implementation, execution, or testing; e. Communicates incident response plan changes to [Assignment: organization-defined incident response personnel (identified by name and/or by role) and organizational elements]; and f. Protects the incident response plan from unauthorized disclosure and modification.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IR-9(3)	INFORMATION SPILLAGE RESPONSE | POST-SPILL OPERATIONS	The organization implements [Assignment: organization-defined procedures] to ensure that organizational personnel impacted by information spills can continue to carry out assigned tasks while contaminated systems are undergoing corrective actions.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
IR-10	INTEGRATED INFORMATION SECURITY ANALYSIS TEAM	The organization establishes an integrated team of forensic/malicious code analysts, tool developers, and real-time operations personnel.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
MA-1	SYSTEM MAINTENANCE POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A system maintenance policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the system maintenance policy and associated system maintenance controls; and b. Reviews and updates the current: 1. System maintenance policy [Assignment: organization-defined frequency]; and 2. System maintenance procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
MA-2	CONTROLLED MAINTENANCE	The organization: a. Schedules, performs, documents, and reviews records of, maintenance and repairs on information system components in accordance with manufacturer or vendor specifications and /or organizational requirements; b. Approves and monitors all maintenance activities, whether performed on site or remotely and whether the equipment is serviced on site or removed to another location; c. Requires that [Assignment: organization-defined personnel] explicitly approve the removal of the information system or system components from organizational facilities for off-site maintenance or repairs; d. Sanitizes equipment to remove all information from associated media prior to removal from organizational facilities for off-site maintenance or repairs; e. Checks all potentially impacted security controls to verify that the controls are still functioning properly following maintenance or repair actions; and f. Includes [Assignment: organization-defined maintenance-related information] in organizational maintenance records.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
MA-3	MAINTENANCE TOOLS	The organization approves, controls, and monitors information system maintenance tools.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
MA-3(1)	MAINTENANCE TOOLS | INSPECT TOOLS	The organization inspects the maintenance tools carried into a facility by maintenance personnel for improper or unauthorized modifications.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
MA-3(2)	MAINTENANCE TOOLS | INSPECT MEDIA	The organization checks all media containing diagnostic and test programs for malicious code before the media are used in the information system.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
MA-4	NONLOCAL MAINTENANCE	The organization: a. Approves and monitors nonlocal maintenance and diagnostic activities; b. Allows the use of nonlocal maintenance and diagnostic tools only as consistent with organizational policy and documented in the security plan for the information system; c. Employs strong authenticators in the establishment of nonlocal maintenance and diagnostic sessions; d. Maintains records for nonlocal maintenance and diagnostic activities; and e. Terminates session and network connections when nonlocal maintenance is completed.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
MA-4(1)	NONLOCAL MAINTENANCE | AUDITING AND REVIEW	The organization: (a) Audits nonlocal maintenance and diagnostic sessions [Assignment: organization-defined audit events]; and (b) Reviews the records of the maintenance and diagnostic sessions.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
MA-4(2)	NONLOCAL MAINTENANCE | DOCUMENT NONLOCAL MAINTENANCE	The organization documents in the security plan for the information system, the policies and procedures for the establishment and use of nonlocal maintenance and diagnostic connections.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
MA-4(3)	NONLOCAL MAINTENANCE | COMPARABLE SECURITY / SANITIZATION	The organization: (a) Requires that non-local maintenance and diagnostic services be performed from an information system that implements a security capability comparable to the capability implemented on the system being serviced; or (b) Removes the component to be serviced from the information system and prior to non-local maintenance or diagnostic services, sanitizes the component (with regard to organizational information) before removal from organizational facilities, and after the service is performed, inspects and sanitizes the component (with regard to potentially malicious software) before reconnecting the component to the information system.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
MA-4(6)	NONLOCAL MAINTENANCE | CRYPTOGRAPHIC PROTECTION	The information system implements cryptographic mechanisms to protect the integrity and confidentiality of nonlocal maintenance and diagnostic communications.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
MA-4(7)	NONLOCAL MAINTENANCE | REMOTE DISCONNECT VERIFICATION	The information system implements remote disconnect verification at the termination of nonlocal maintenance and diagnostic sessions.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
MA-5	MAINTENANCE PERSONNEL	The organization: a. Establishes a process for maintenance personnel authorization and maintains a list of authorized maintenance organizations or personnel; b. Ensures that non-escorted personnel performing maintenance on the information system have required access authorizations; and c. Designates organizational personnel with required access authorizations and technical competence to supervise the maintenance activities of personnel who do not possess the required access authorizations.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
MA-6	TIMELY MAINTENANCE	The organization obtains maintenance support and/or spare parts for [Assignment: organization-defined information system components] within [Assignment: organization-defined time period] of failure.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
MP-1	MEDIA PROTECTION POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A media protection policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the media protection policy and associated media protection controls; and b. Reviews and updates the current: 1. Media protection policy [Assignment: organization-defined frequency]; and 2. Media protection procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
MP-2	MEDIA ACCESS	The organization restricts access to [Assignment: organization-defined types of digital and/or non-digital media] to [Assignment: organization-defined personnel or roles].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
MP-4	MEDIA STORAGE	The organization: a. Physically controls and securely stores [Assignment: organization-defined types of digital and/or non-digital media] within [Assignment: organization-defined controlled areas]; and b. Protects information system media until the media are destroyed or sanitized using approved equipment, techniques, and procedures.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
MP-5	MEDIA TRANSPORT	The organization: a. Protects and controls [Assignment: organization-defined types of information system media] during transport outside of controlled areas using [Assignment: organization-defined security safeguards]; b. Maintains accountability for information system media during transport outside of controlled areas; c. Documents activities associated with the transport of information system media; and d. Restricts the activities associated with the transport of information system media to authorized personnel.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
MP-5(4)	MEDIA TRANSPORT | CRYPTOGRAPHIC PROTECTION	The information system implements cryptographic mechanisms to protect the confidentiality and integrity of information stored on digital media during transport outside of controlled areas.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
MP-6	MEDIA SANITIZATION	The organization: a. Sanitizes [Assignment: organization-defined information system media] prior to disposal, release out of organizational control, or release for reuse using [Assignment: organization-defined sanitization techniques and procedures] in accordance with applicable federal and organizational standards and policies; and b. Employs sanitization mechanisms with the strength and integrity commensurate with the security category or classification of the information.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
MP-7	MEDIA USE	The organization [Selection: restricts; prohibits] the use of [Assignment: organization-defined types of information system media] on [Assignment: organization-defined information systems or system components] using [Assignment: organization-defined security safeguards].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
MP-7(1)	MEDIA USE | PROHIBIT USE WITHOUT OWNER	The organization prohibits the use of portable storage devices in organizational information systems when such devices have no identifiable owner.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PE-1	PHYSICAL AND ENVIRONMENTAL PROTECTION POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A physical and environmental protection policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the physical and environmental protection policy and associated physical and environmental protection controls; and b. Reviews and updates the current: 1. Physical and environmental protection policy [Assignment: organization-defined frequency]; and 2. Physical and environmental protection procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PE-2	PHYSICAL ACCESS AUTHORIZATIONS	The organization: a. Develops, approves, and maintains a list of individuals with authorized access to the facility where the information system resides; b. Issues authorization credentials for facility access; c. Reviews the access list detailing authorized facility access by individuals [Assignment: organization-defined frequency]; and d. Removes individuals from the facility access list when access is no longer required.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PE-3	PHYSICAL ACCESS CONTROL	The organization: a. Enforces physical access authorizations at [Assignment: organization-defined entry/exit points to the facility where the information system resides] by; 1. Verifying individual access authorizations before granting access to the facility; and 2. Controlling ingress/egress to the facility using [Selection (one or more): [Assignment: organization-defined physical access control systems/devices]; guards]; b. Maintains physical access audit logs for [Assignment: organization-defined entry/exit points]; c. Provides [Assignment: organization-defined security safeguards] to control access to areas within the facility officially designated as publicly accessible; d. Escorts visitors and monitors visitor activity [Assignment: organization-defined circumstances requiring visitor escorts and monitoring]; e. Secures keys, combinations, and other physical access devices; f. Inventories [Assignment: organization-defined physical access devices] every [Assignment: organization-defined frequency]; and g. Changes combinations and keys [Assignment: organization-defined frequency] and/or when keys are lost, combinations are compromised, or individuals are transferred or terminated.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PE-3(1)	PHYSICAL ACCESS CONTROL | INFORMATION SYSTEM ACCESS	The organization enforces physical access authorizations to the information system in addition to the physical access controls for the facility at [Assignment: organization-defined physical spaces containing one or more components of the information system].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PE-4	ACCESS CONTROL FOR TRANSMISSION MEDIUM	The organization controls physical access to [Assignment: organization-defined information system distribution and transmission lines] within organizational facilities using [Assignment: organization-defined security safeguards].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PE-6	MONITORING PHYSICAL ACCESS	The organization: a. Monitors physical access to the facility where the information system resides to detect and respond to physical security incidents; b. Reviews physical access logs [Assignment: organization-defined frequency] and upon occurrence of [Assignment: organization-defined events or potential indications of events]; and c. Coordinates results of reviews and investigations with the organizational incident response capability.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PE-6(1)	MONITORING PHYSICAL ACCESS | INTRUSION ALARMS / SURVEILLANCE EQUIPMENT	The organization monitors physical intrusion alarms and surveillance equipment.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PE-6(4)	MONITORING PHYSICAL ACCESS | MONITORING PHYSICAL ACCESS TO INFORMATION SYSTEMS	The organization monitors physical access to the information system in addition to the physical access monitoring of the facility as [Assignment: organization-defined physical spaces containing one or more components of the information system].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PE-8	VISITOR ACCESS RECORDS	The organization: a. Maintains visitor access records to the facility where the information system resides for [Assignment: organization-defined time period]; and b. Reviews visitor access records [Assignment: organization-defined frequency].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.

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PE-9	POWER EQUIPMENT AND CABLING	The organization protects power equipment and power cabling for the information system from damage and destruction.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PE-10	EMERGENCY SHUTOFF	The organization: a. Provides the capability of shutting off power to the information system or individual system components in emergency situations; b. Places emergency shutoff switches or devices in [Assignment: organization-defined location by information system or system component] to facilitate safe and easy access for personnel; and c. Protects emergency power shutoff capability from unauthorized activation.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PE-11	EMERGENCY POWER	The organization provides a short-term uninterruptible power supply to facilitate [Selection (one or more): an orderly shutdown of the information system; transition of the information system to long-term alternate power] in the event of a primary power source loss.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PE-11(1)	EMERGENCY POWER | LONG-TERM ALTERNATE POWER SUPPLY - MINIMAL OPERATIONAL CAPABILITY	The organization provides a long-term alternate power supply for the information system that is capable of maintaining minimally required operational capability in the event of an extended loss of the primary power source.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PE-12	EMERGENCY LIGHTING	The organization employs and maintains automatic emergency lighting for the information system that activates in the event of a power outage or disruption and that covers emergency exits and evacuation routes within the facility.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PE-13	FIRE PROTECTION	The organization employs and maintains fire suppression and detection devices/systems for the information system that are supported by an independent energy source.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PE-14	TEMPERATURE AND HUMIDITY CONTROLS	The organization: a. Maintains temperature and humidity levels within the facility where the information system resides at [Assignment: organization - defined acceptable levels]; and b. Monitors temperature and humidity levels [Assignment: organization-defined frequency].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PE-15	WATER DAMAGE PROTECTION	The organization protects the information system from damage resulting from water leakage by providing master shutoff or isolation valves that are accessible, working properly, and known to key personnel.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PE-16	DELIVERY AND REMOVAL	The organization authorizes, monitors, and controls [Assignment: organization-defined types of information system components] entering and exiting the facility and maintains records of those items.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PL-1	SECURITY PLANNING POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A security planning policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the security planning policy and associated security planning controls; and b. Reviews and updates the current: 1. Security planning policy [Assignment: organization-defined frequency]; and 2. Security planning procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PL-2	SYSTEM SECURITY PLAN	The organization: a. Develops a security plan for the information system that: 1. Is consistent with the organization's enterprise architecture; 2. Explicitly defines the authorization boundary for the system; 3. Describes the operational context of the information system in terms of missions and business processes; 4. Provides the security categorization of the information system including supporting rationale; 5. Describes the operational environment for the information system and relationships with or connections to other information systems; 6. Provides an overview of the security requirements for the system; 7. Identifies any relevant overlays, if applicable 8. Describes the security controls in place or planned for meeting those requirements including a rationale for the tailoring decisions; and 9. Is reviewed and approved by the authorizing official or designated representative prior to plan implementation; b. Distributes copies of the security plan and communicates subsequent changes to the plan to [Assignment: organization-defined personnel or roles]; c. Reviews the security plan for the information system [Assignment: organization-defined frequency]; d. Updates the plan to address changes to the information system/environment of operation or problems identified during plan implementation or security control assessments; and e. Protects the security plan from unauthorized disclosure and modification.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PL-2(3)	SYSTEM SECURITY PLAN | PLAN / COORDINATE WITH OTHER ORGANIZATIONAL ENTITIES	The organization plans and coordinates security-related activities affecting the information system with [Assignment: organization-defined individuals or groups] before conducting such activities in order to reduce the impact on other organizational entities.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PL-4	RULES OF BEHAVIOR	The organization: a. Establishes and makes readily available to individuals requiring access to the information system, the rules that describe their responsibilities and expected behavior with regard to information and information system usage; b. Receives a signed acknowledgment from such individuals, indicating that they have read, understand, and agree to abide by the rules of behavior, before authorizing access to information and the information system; c. Reviews and updates the rules of behavior [Assignment: organization-defined frequency]; and d. Requires individuals who have signed a previous version of the rules of behavior to read and resign when the rules of behavior are revised/updated.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.

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PL-8	INFORMATION SECURITY ARCHITECTURE	The organization: a. Develops an information security architecture for the information system that: 1. Describes the overall philosophy, requirements, and approach to be taken with regard to protecting the confidentiality, integrity, and availability of organizational information; 2. Describes how the information security architecture is integrated into and supports the enterprise architecture; and 3. Describes any information security assumptions about, and dependencies on, external services; b. Reviews and updates the information security architecture [Assignment: organization-defined frequency] to reflect updates in the enterprise architecture; and c. Ensures that planned information security architecture changes are reflected in the security plan, the security Concept of Operations (CONOPS), and organizational procurements/acquisitions.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PL-8(1)	INFORMATION SECURITY ARCHITECTURE | DEFENSE-IN-DEPTH	The organization designs its security architecture using a defense-in-depth approach that: (a) Allocates [Assignment: organization-defined security safeguards] to [Assignment: organization-defined locations and architectural layers]; and (b) Ensures that the allocated security safeguards operate in a coordinated and mutually reinforcing manner.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PS-1	PERSONNEL SECURITY POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A personnel security policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the personnel security policy and associated personnel security controls; and b. Reviews and updates the current: 1. Personnel security policy [Assignment: organization-defined frequency]; and 2. Personnel security procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PS-2	POSITION RISK DESIGNATION	The organization: a. Assigns a risk designation to all organizational positions; b. Establishes screening criteria for individuals filling those positions; and c. Reviews and updates position risk designations [Assignment: organization-defined frequency].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PS-3	PERSONNEL SCREENING	The organization: a. Screens individuals prior to authorizing access to the information system; and b. Rescreens individuals according to [Assignment: organization -defined conditions requiring rescreening and, where re-screening is so indicated, the frequency of such rescreening].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PS-4	PERSONNEL TERMINATION	The organization, upon termination of individual employment: a. Disables information system access within [Assignment: organization-defined time period]; b. Terminates/revokes any authenticators/credentials associated with the individual; c. Conducts exit interviews that include a discussion of [Assignment: organization-defined information security topics]; d. Retrieves all security-related organizational information system-related property; e. Retains access to organizational information and information systems formerly controlled by terminated individual; and f. Notifies [Assignment: organization-defined personnel or roles] within [Assignment: organization-defined time period].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PS-5	PERSONNEL TRANSFER	The organization: a. Reviews and confirms ongoing operational need for current logical and physical access authorizations to information systems/facilities when individuals are reassigned or transferred to other positions within the organization; b. Initiates [Assignment: organization-defined transfer or reassignment actions] within [Assignment: organization-defined time period following the formal transfer action]; c. Modifies access authorization as needed to correspond with any changes in operational need due to reassignment or transfer; and d. Notifies [Assignment: organization-defined personnel or roles] within [Assignment: organization-defined time period].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PS-6	ACCESS AGREEMENTS	The organization: a. Develops and documents access agreements for organizational information systems; b. Reviews and updates the access agreements [Assignment: organization-defined frequency]; and c. Ensures that individuals requiring access to organizational information and information systems: 1. Sign appropriate access agreements prior to being granted access; and 2. Re-sign access agreements to maintain access to organizational information systems when access agreements have been updated or [Assignment: organization-defined frequency].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PS-7	THIRD-PARTY PERSONNEL SECURITY	The organization: a. Establishes personnel security requirements including security roles and responsibilities for third-party providers; b. Requires third-party providers to comply with personnel security policies and procedures established by the organization; c. Documents personnel security requirements; d. Requires third-party providers to notify [Assignment: organization-defined personnel or roles] of any personnel transfers or terminations of third-party personnel who possess organizational credentials and/or badges, or who have information system privileges within [Assignment: organization-defined time period]; and e. Monitors provider compliance.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PS-8	PERSONNEL SANCTIONS	The organization: a. Employs a formal sanctions process for individuals failing to comply with established information security policies and procedures; and b. Notifies [Assignment: organization-defined personnel or roles] within [Assignment: organization-defined time period] when a formal employee sanctions process is initiated, identifying the individual sanctioned and the reason for the sanction.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
RA-1	RISK ASSESSMENT POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A risk assessment policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the risk assessment policy and associated risk assessment controls; and b. Reviews and updates the current: 1. Risk assessment policy [Assignment: organization-defined frequency]; and 2. Risk assessment procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
RA-2	SECURITY CATEGORIZATION	The organization: a. Categorizes information and the information system in accordance with applicable federal laws, Executive Orders, directives, policies, regulations, standards, and guidance; b. Documents the security categorization results (including supporting rationale) in the security plan for the information system; and c. Ensures that the security categorization decision is reviewed and approved by the authorizing official or authorizing official designated representative.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
RA-3	RISK ASSESSMENT	The organization: a. Conducts an assessment of risk, including the likelihood and magnitude of harm, from the unauthorized access, use, disclosure, disruption, modification, or destruction of the information system and the information it processes, stores, or transmits; b. Documents risk assessment results in [Selection: security plan; risk assessment report; [Assignment: organization-defined document]]; c. Reviews risk assessment results [Assignment: organization-defined frequency]; d. Disseminates risk assessment results to [Assignment: organization-defined personnel or roles]; and e. Updates the risk assessment [Assignment: organization-defined frequency] or whenever there are significant changes to the information system or environment of operation (including the identification of new threats and vulnerabilities), or other conditions that may impact the security state of the system.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
RA-5	VULNERABILITY SCANNING	The organization: a. Scans for vulnerabilities in the information system and hosted applications [Assignment: organization-defined frequency and/or randomly in accordance with organization-defined process] and when new vulnerabilities potentially affecting the system/applications are identified and reported; b. Employs vulnerability scanning tools and techniques that facilitate interoperability among tools and automate parts of the vulnerability management process by using standards for: 1. Enumerating platforms, software flaws, and improper configurations; 2. Formatting checklists and test procedures; and 3. Measuring vulnerability impact; c. Analyzes vulnerability scan reports and results from security control assessments; d. Remediates legitimate vulnerabilities [Assignment: organization-defined response times] in accordance with an organizational assessment of risk; and e. Shares information obtained from the vulnerability scanning process and security control assessments with [Assignment: organization-defined personnel or roles] to help eliminate similar vulnerabilities in other information systems (i.e., systemic weaknesses or deficiencies).	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
RA-5(1)	VULNERABILITY SCANNING | UPDATE TOOL CAPABILITY	The organization employs vulnerability scanning tools that include the capability to readily update the information system vulnerabilities to be scanned.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
RA-5(2)	VULNERABILITY SCANNING | UPDATE BY FREQUENCY / PRIOR TO NEW SCAN / WHEN IDENTIFIED	The organization updates the information system vulnerabilities scanned [Selection (one or more): [Assignment: organization-defined frequency]; prior to a new scan; when new vulnerabilities are identified and reported].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
RA-5(5)	VULNERABILITY SCANNING | PRIVILEGED ACCESS	The information system implements privileged access authorization to [Assignment: organization-identified information system components] for selected [Assignment: organization-defined vulnerability scanning activities].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SA-1	SYSTEM AND SERVICES ACQUISITION POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A system and services acquisition policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the system and services acquisition policy and associated system and services acquisition controls; and b. Reviews and updates the current: 1. System and services acquisition policy [Assignment: organization-defined frequency]; and 2. System and services acquisition procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SA-2	ALLOCATION OF RESOURCES	The organization: a. Determines information security requirements for the information system or information system service in mission/business process planning; b. Determines, documents, and allocates the resources required to protect the information system or information system service as part of its capital planning and investment control process; and c. Establishes a discrete line item for information security in organizational programming and budgeting documentation	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SA-3	SYSTEM DEVELOPMENT LIFE CYCLE	The organization: a. Manages the information system using [Assignment: organization-defined system development life cycle] that incorporates information security considerations; b. Defines and documents information security roles and responsibilities throughout the system development life cycle; c. Identifies individuals having information security roles and responsibilities; and d. Integrates the organizational information security risk management process into system development life cycle activities.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
SA-4	ACQUISITION PROCESS	The organization includes the following requirements, descriptions, and criteria, explicitly or by reference, in the acquisition contract for the information system, system component, or information system service in accordance with applicable federal laws, Executive Orders, directives, policies, regulations, standards, guidelines, and organizational mission/business needs: a. Security functional requirements; b. Security strength requirements; c. Security assurance requirements; d. Security-related documentation requirements; e. Requirements for protecting security-related documentation; f. Description of the information system development environment and environment in which the system is intended to operate; and g. Acceptance criteria.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SA-4(1)	ACQUISITION PROCESS | FUNCTIONAL PROPERTIES OF SECURITY CONTROLS	The organization requires the developer of the information system, system component, or information system service to provide a description of the functional properties of the security controls to be employed.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SA-4(2)	ACQUISITION PROCESS | DESIGN / IMPLEMENTATION INFORMATION FOR SECURITY CONTROLS	The organization requires the developer of the information system, system component, or information system service to provide design and implementation information for the security controls to be employed that includes: [Selection (one or more): security-relevant external system interfaces; high-level design; low-level design; source code or hardware schematics; [Assignment: organization-defined design/implementation information]] at [Assignment: organization-defined level of detail].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SA-4(7)	ACQUISITION PROCESS | NIAP-APPROVED PROTECTION PROFILES	The organization: (a) Limits the use of commercially provided information assurance (IA) and IA-enabled information technology products to those products that have been successfully evaluated against a National Information Assurance partnership (NIAP)-approved Protection Profile for a specific technology type, if such a profile exists; and (b) Requires, if no NIAP-approved Protection Profile exists for a specific technology type but a commercially provided information technology product relies on cryptographic functionality to enforce its security policy, that the cryptographic module is FIPS-validated.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SA-4(9)	ACQUISITION PROCESS | FUNCTIONS / PORTS / PROTOCOLS / SERVICES IN USE	The organization requires the developer of the information system, system component, or information system service to identify early in the system development life cycle, the functions, ports, protocols, and services intended for organizational use.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SA-4(10)	ACQUISITION PROCESS | USE OF APPROVED PIV PRODUCTS	The organization employs only information technology products on the FIPS 201-approved products list for Personal Identity Verification (PIV) capability implemented within organizational information systems.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SA-5	INFORMATION SYSTEM DOCUMENTATION	The organization: a. Obtains administrator documentation for the information system, system component, or information system service that describes: 1. Secure configuration, installation, and operation of the system, component, or service; 2. Effective use and maintenance of security functions/mechanisms; and 3. Known vulnerabilities regarding configuration and use of administrative (i.e., privileged) functions; b. Obtains user documentation for the information system, system component, or information system service that describes: 1. User-accessible security functions/mechanisms and how to effectively use those security functions/mechanisms; 2. Methods for user interaction, which enables individuals to use the system, component, or service in a more secure manner; and 3. User responsibilities in maintaining the security of the system, component, or service; c. Documents attempts to obtain information system, system component, or information system service documentation when such documentation is either unavailable or nonexistent and [Assignment: organization-defined actions] in response; d. Protects documentation as required, in accordance with the risk management strategy; and e. Distributes documentation to [Assignment: organization-defined personnel or roles].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SA-8	SECURITY ENGINEERING PRINCIPLES	The organization applies information system security engineering principles in the specification, design, development, implementation, and modification of the information system.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SA-9	EXTERNAL INFORMATION SYSTEM SERVICES	The organization: a. Requires that providers of external information system services comply with organizational information security requirements and employ [Assignment: organization-defined security controls] in accordance with applicable federal laws, Executive Orders, directives, policies, regulations, standards, and guidance; b. Defines and documents government oversight and user roles and responsibilities with regard to external information system services; and c. Employs [Assignment: organization-defined processes, methods, and techniques] to monitor security control compliance by external service providers on an ongoing basis.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SA-9(1)	EXTERNAL INFORMATION SYSTEMS | RISK ASSESSMENTS / ORGANIZATIONAL APPROVALS	The organization: (a) Conducts an organizational assessment of risk prior to the acquisition or outsourcing of dedicated information security services; and (b) Ensures that the acquisition or outsourcing of dedicated information security services is approved by [Assignment: organization-defined personnel or roles].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SA-9(2)	EXTERNAL INFORMATION SYSTEMS | IDENTIFICATION OF FUNCTIONS / PORTS / PROTOCOLS / SERVICES	The organization requires providers of [Assignment: organization-defined external information system services] to identify the functions, ports, protocols, and other services required for the use of such services.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
SA-10	DEVELOPER CONFIGURATION MANAGEMENT	The organization requires the developer of the information system, system component, or information system service to: a. Perform configuration management during system, component, or service [Selection (one or more): design; development; implementation; operation]; b. Document, manage, and control the integrity of changes to [Assignment: organization-defined configuration items under configuration management]; c. Implement only organization-approved changes to the system, component, or service; d. Document approved changes to the system, component, or service and the potential security impacts of such changes; and e. Track security flaws and flaw resolution within the system, component, or service and report findings to [Assignment: organization-defined personnel].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SA-10(1)	DEVELOPER CONFIGURATION MANAGEMENT | SOFTWARE / FIRMWARE INTEGRITY VERIFICATION	The organization requires the developer of the information system, system component, or information system service to enable integrity verification of software and firmware components.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SA-11	DEVELOPER SECURITY TESTING AND EVALUATION	The organization requires the developer of the information system, system component, or information system service to: a. Create and implement a security assessment plan; b. Perform [Selection (one or more): unit; integration; system; regression] testing/evaluation at [Assignment: organization-defined depth and coverage]; c. Produce evidence of the execution of the security assessment plan and the results of the security testing/evaluation; d. Implement a verifiable flaw remediation process; and e. Correct flaws identified during security testing/evaluation.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SA-12	SUPPLY CHAIN PROTECTION	The organization protects against supply chain threats to the information system, system component, or information system service by employing [Assignment: organization-defined security safeguards] as part of a comprehensive, defense-in-breadth information security strategy.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SA-15	DEVELOPMENT PROCESS, STANDARDS, AND TOOLS	The organization: a. Requires the developer of the information system, system component, or information system service to follow a documented development process that: 1. Explicitly addresses security requirements; 2. Identifies the standards and tools used in the development process; 3. Documents the specific tool options and tool configurations used in the development process; and 4. Documents, manages, and ensures the integrity of changes to the process and/or tools used in development; and b. Reviews the development process, standards, tools, and tool options/configurations [Assignment: organization-defined frequency] to determine if the process, standards, tools, and tool options/configurations selected and employed can satisfy [Assignment: organization-defined security requirements].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SA-19	COMPONENT AUTHENTICITY	The organization: a. Develops and implements anti-counterfeit policy and procedures that include the means to detect and prevent counterfeit components from entering the information system; and b. Reports counterfeit information system components to [Selection (one or more): source of counterfeit component; [Assignment: organization-defined external reporting organizations]; [Assignment: organization-defined personnel or roles]].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-1	SYSTEM AND COMMUNICATIONS PROTECTION POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A system and communications protection policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the system and communications protection policy and associated system and communications protection controls; and b. Reviews and updates the current: 1. System and communications protection policy [Assignment: organization-defined frequency]; and 2. System and communications protection procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-2	APPLICATION PARTITIONING	The information system separates user functionality (including user interface services)from information system management functionality.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-5	DENIAL OF SERVICE PROTECTION	The information system protects against or limits the effects of the following types of denial of service attacks: [Assignment: organization-defined types of denial of service attacks or reference to source for such information] by employing [Assignment: organization-defined security safeguards].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-5(1)	DENIAL OF SERVICE PROTECTION | RESTRICT INTERNAL USERS	The information system restricts the ability of individuals to launch [Assignment: organization-defined denial of service attacks] against other information systems.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-5(2)	DENIAL OF SERVICE PROTECTION | EXCESS CAPACITY / BANDWIDTH / REDUNDANCY	The information system manages excess capacity, bandwidth, or other redundancy to limit the effects of information flooding denial of service attacks.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-5(3)	DENIAL OF SERVICE PROTECTION | DETECTION / MONITORING	The organization: (a) Employs [Assignment: organization-defined monitoring tools] to detect indicators of denial of service attacks against the information system; and (b) Monitors [Assignment: organization-defined information system resources] to determine if sufficient resources exist to prevent effective denial of service attacks.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-7	BOUNDARY PROTECTION	The information system: a. Monitors and controls communications at the external boundary of the system and at key internal boundaries within the system; b. Implements subnetworks for publicly accessible system components that are [Selection: physically; logically] separated from internal organizational networks; and c. Connects to external networks or information systems only through managed interfaces consisting of boundary protection devices arranged in accordance with an organizational security architecture.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-7(3)	BOUNDARY PROTECTION | ACCESS POINTS	The organization limits the number of external network connections to the information system.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
SC-7(4)	BOUNDARY PROTECTION | EXTERNAL TELECOMMUNICATIONS SERVICES	The organization: (a) Implements a managed interface for each external telecommunication service; (b) Establishes a traffic flow policy for each managed interface; (c) Protects the confidentiality and integrity of the information being transmitted across each interface; (d) Documents each exception to the traffic flow policy with a supporting mission/business need and duration of that need; and (e) Reviews exceptions to the traffic flow policy [Assignment: organization-defined frequency] and removes exceptions that are no longer supported by an explicit mission/business need.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-7(5)	BOUNDARY PROTECTION | DENY BY DEFAULT / ALLOW BY EXCEPTION	The information system at managed interfaces denies network communications traffic by default and allows network communications traffic by exception (i.e., deny all, permit by exception).	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-7(7)	BOUNDARY PROTECTION | PREVENT SPLIT TUNNELING FOR REMOTE DEVICES	The information system, in conjunction with a remote device, prevents the device from simultaneously establishing non-remote connections with the system and communicating via some other connection to resources in external networks.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-7(8)	BOUNDARY PROTECTION | ROUTE TRAFFIC TO AUTHENTICATED PROXY SERVERS	The information system routes [Assignment: organization-defined internal communications traffic] to [Assignment: organization-defined external networks] through authenticated proxy servers at managed interfaces.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-7(9)	BOUNDARY PROTECTION | RESTRICT THREATENING OUTGOING COMMUNICATIONS TRAFFIC	The information system: (a) Detects and denies outgoing communications traffic posing a threat to external information systems; and (b) Audits the identity of internal users associated with denied communications.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-7(11)	BOUNDARY PROTECTION | RESTRICT INCOMING COMMUNICATIONS TRAFFIC	The information system only allows incoming communications from [Assignment: organization defined authorized sources] routed to [Assignment: organization-defined authorized destinations].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-7(12)	BOUNDARY PROTECTION | HOST-BASED PROTECTION	The organization implements [Assignment: organization-defined host-based boundary protection mechanisms] at [Assignment: organization-defined information system components].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-7(13)	BOUNDARY PROTECTION | ISOLATION OF SECURITY TOOLS / MECHANISMS / SUPPORT COMPONENTS	The organization isolates [Assignment: organization-defined information security tools, mechanisms, and support components] from other internal information system components by implementing physically separate subnetworks with managed interfaces to other components of the system.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-7(14)	BOUNDARY PROTECTION | PROTECTS AGAINST UNAUTHORIZED PHYSICAL CONNECTION	The organization protects against unauthorized physical connections at [Assignment: organization-defined managed interfaces].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-7(18)	BOUNDARY PROTECTION | FAIL SECURE	The information system fails securely in the event of an operational failure of a boundary protection device.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-8	TRANSMISSION CONFIDENTIALITY AND INTEGRITY	The information system protects the [Selection (one or more): confidentiality; integrity] of transmitted information.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-8(1)	TRANSMISSION CONFIDENTIALITY AND INTEGRITY | CRYPTOGRAPHIC OR ALTERNATE PHYSICAL PROTECTION	The information system implements cryptographic mechanisms to [Selection (one or more): prevent unauthorized disclosure of information; detect changes to information] during transmission unless otherwise protected by [Assignment: organization-defined alternative physical safeguards].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-8(2)	TRANSMISSION CONFIDENTIALITY AND INTEGRITY | PRE / POST TRANSMISSION HANDLING	The information system maintains the [Selection (one or more): confidentiality; integrity] of information during preparation for transmission and during reception.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-10	NETWORK DISCONNECT	The information system terminates the network connection associated with a communications session at the end of the session or after [Assignment: organization-defined time period] of inactivity.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-12	CRYPTOGRAPHIC KEY ESTABLISHMENT AND MANAGEMENT	The organization establishes and manages cryptographic keys for required cryptography employed within the information system in accordance with [Assignment: organization-defined requirements for key generation, distribution, storage, access, and destruction].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-13	CRYPTOGRAPHIC PROTECTION	The information system implements [Assignment: organization-defined cryptographic uses and type of cryptography required for each use] in accordance with applicable federal laws, Executive Orders, directives, policies, regulations, and standards.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-15	COLLABORATIVE COMPUTING DEVICES	The information system: a. Prohibits remote activation of collaborative computing devices with the following exceptions: [Assignment: organization-defined exceptions where remote activation is to be allowed]; and b. Provides an explicit indication of use to users physically present at the devices.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-17	PUBLIC KEY INFRASTRUCTURE CERTIFICATES	The organization issues public key certificates under an [Assignment: organization defined certificate policy] or obtains public key certificates from an approved service provider.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-18	MOBILE CODE	The organization: a. Defines acceptable and unacceptable mobile code and mobile code technologies; b. Establishes usage restrictions and implementation guidance for acceptable mobile code and mobile code technologies; and c. Authorizes, monitors, and controls the use of mobile code within the information system.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-18(1)	MOBILE CODE | IDENTIFY UNACCEPTABLE CODE / TAKE CORRECTIVE ACTIONS	The information system identifies [Assignment: organization-defined unacceptable mobile code] and takes [Assignment: organization-defined corrective actions].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-18(2)	MOBILE CODE | ACQUISITION / DEVELOPMENT / USE	The organization ensures that the acquisition, development, and use of mobile code to be deployed in the information system meets [Assignment: organization-defined mobile code requirements].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
SC-18(3)	MOBILE CODE | PREVENT DOWNLOADING / EXECUTION	The information system prevents the download and execution of [Assignment: organization defined unacceptable mobile code].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-18(4)	MOBILE CODE | PREVENT AUTOMATIC EXECUTION	The information system prevents the automatic execution of mobile code in [Assignment: organization-defined software applications] and enforces [Assignment: organization-defined actions] prior to executing the code.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-19	VOICE OVER INTERNET PROTOCOL	The organization: a. Establishes usage restrictions and implementation guidance for Voice over Internet Protocol (VoIP) technologies based on the potential to cause damage to the information system if used maliciously; and b. Authorizes, monitors, and controls the use of VoIP within the information system.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-20	SECURE NAME / ADDRESS RESOLUTION SERVICE (AUTHORITATIVE SOURCE)	The information system: a. Provides additional data origin authentication and integrity verification artifacts along with the authoritative name resolution data the system returns in response to external name/address resolution queries; and b. Provides the means to indicate the security status of child zones and (if the child supports secure resolution services) to enable verification of a chain of trust among parent and child domains, when operating as part of a distributed, hierarchical namespace.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-21	SECURE NAME / ADDRESS RESOLUTION SERVICE (RECURSIVE OR CACHING RESOLVER)	The information system requests and performs data origin authentication and data integrity verification on the name/address resolution responses the system receives from authoritative sources.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-22	ARCHITECTURE AND PROVISIONING FOR NAME / ADDRESS RESOLUTION SERVICE	The information systems that collectively provide name/address resolution service for an organization are fault-tolerant and implement internal/external role separation.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-23	SESSION AUTHENTICITY	The information system protects the authenticity of communications sessions.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-23(1)	SESSION AUTHENTICITY | INVALIDATE SESSION IDENTIFIERS AT LOGOUT	The information system invalidates session identifiers upon user logout or other session termination.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-23(3)	SESSION AUTHENTICITY | UNIQUE SESSION IDENTIFIERS WITH RANDOMIZATION	The information system generates a unique session identifier for each session with [Assignment: organization-defined randomness requirements] and recognizes only session identifiers that are system-generated.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-23(5)	SESSION AUTHENTICITY | ALLOWED CERTIFICATE AUTHORITIES	The information system only allows the installation of [Assignment: organization-defined certificate authorities] for verification of the establishment of protected sessions.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-24	FAIL IN KNOWN STATE	The information system fails to a [Assignment: organization-defined known-state] for [Assignment: organization-defined types of failures] preserving [Assignment: organization-defined system state information] in failure.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-28	PROTECTION OF INFORMATION AT REST	The information system protects the [Selection (one or more): confidentiality; integrity] of [Assignment: organization-defined information at rest].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-28(1)	PROTECTION OF INFORMATION AT REST | CRYPTOGRAPHIC PROTECTION	The information system implements cryptographic mechanisms to prevent unauthorized disclosure and modification of [Assignment: organization-defined information] on [Assignment: organization-defined information system components].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-38	OPERATIONS SECURITY	The organization employs [Assignment: organization-defined operations security safeguards] to protect key organizational information throughout the system development life cycle.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-39	PROCESS ISOLATION	The information system maintains a separate execution domain for each executing process.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SC-41	PORT AND I/O DEVICE ACCESS	The organization physically disables or removes [Assignment: organization-defined connection ports or input/output devices] on [Assignment: organization-defined information systems or information system components].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-1	SYSTEM AND INFORMATION INTEGRITY POLICY AND PROCEDURES	The organization: a. Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]: 1. A system and information integrity policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and 2. Procedures to facilitate the implementation of the system and information integrity policy and associated system and information integrity controls; and b. Reviews and updates the current: 1. System and information integrity policy [Assignment: organization-defined frequency]; and 2. System and information integrity procedures [Assignment: organization-defined frequency].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-2	FLAW REMEDIATION	The organization: a. Identifies, reports, and corrects information system flaws; b. Tests software and firmware updates related to flaw remediation for effectiveness and potential side effects before installation; c. Installs security-relevant software and firmware updates within [Assignment: organization-defined time period] of the release of the updates; and d. Incorporates flaw remediation into the organizational configuration management process.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-2(1)	FLAW REMEDIATION | CENTRAL MANAGEMENT	The organization centrally manages the flaw remediation process.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-2(2)	FLAW REMEDIATION | AUTOMATED FLAW REMEDIATION STATUS	The organization employs automated mechanisms [Assignment: organization-defined frequency] to determine the state of information system components with regard to flaw remediation.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
SI-2(6)	FLAW REMEDIATION | REMOVAL OF PREVIOUS VERSIONS OF SOFTWARE / FIRMWARE	The organization removes [Assignment: organization-defined software and firmware components] after updated versions have been installed.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-3	MALICIOUS CODE PROTECTION	The organization: a. Employs malicious code protection mechanisms at information system entry and exit points to detect and eradicate malicious code; b. Updates malicious code protection mechanisms whenever new releases are available in accordance with organizational configuration management policy and procedures; c. Configures malicious code protection mechanisms to: 1. Perform periodic scans of the information system [Assignment: organization-defined frequency] and real-time scans of files from external sources at [Selection (one or more); endpoint; network entry/exit points] as the files are downloaded, opened, or executed in accordance with organizational security policy; and 2. [Selection (one or more): block malicious code; quarantine malicious code; send alert to administrator; [Assignment: organization-defined action]] in response to malicious code detection; and d. Addresses the receipt of false positives during malicious code detection and eradication and the resulting potential impact on the availability of the information system.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-3(1)	MALICIOUS CODE PROTECTION | CENTRAL MANAGEMENT	The organization centrally manages malicious code protection mechanisms.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-3(2)	MALICIOUS CODE PROTECTION | AUTOMATIC UPDATES	The information system automatically updates malicious code protection mechanisms.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-3(10)	MALICIOUS CODE PROTECTION | MALICIOUS CODE ANALYSIS	The organization: (a) Employs [Assignment: organization-defined tools and techniques] to analyze the characteristics and behavior of malicious code; and (b) Incorporates the results from malicious code analysis into organizational incident response and flaw remediation processes.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-4	INFORMATION SYSTEM MONITORING	The organization: a. Monitors the information system to detect: 1. Attacks and indicators of potential attacks in accordance with [Assignment: organization-defined monitoring objectives]; and 2. Unauthorized local, network, and remote connections; b. Identifies unauthorized use of the information system through [Assignment: organization-defined techniques and methods]; c. Deploys monitoring devices: (i) strategically within the information system to collect organization-determined essential information; and (ii) at ad hoc locations within the system to track specific types of transactions of interest to the organization; d. Protects information obtained from intrusion-monitoring tools from unauthorized access, modification, and deletion; e. Heightens the level of information system monitoring activity whenever there is an indication of increased risk to organizational operations and assets, individuals, other organizations, or the Nation based on law enforcement information, intelligence information, or other credible sources of information; f. Obtains legal opinion with regard to information system monitoring activities in accordance with applicable federal laws, Executive Orders, directives, policies, or regulations; and g. Provides [Assignment: organization-defined information system monitoring information] to [Assignment: organization-defined personnel or roles] [Selection (one or more): as needed; [Assignment: organization-defined frequency]].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-4(1)	INFORMATION SYSTEM MONITORING | SYSTEM-WIDE INTRUSION DETECTION SYSTEM	The organization connects and configures individual intrusion detection tools into an information system-wide intrusion detection system.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-4(2)	INFORMATION SYSTEM MONITORING | AUTOMATED TOOLS FOR REAL-TIME ANALYSIS	The organization employs automated tools to support near real-time analysis of events.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-4(4)	INFORMATION SYSTEM MONITORING | INBOUND AND OUTBOUND COMMUNICATIONS TRAFFIC	The information system monitors inbound and outbound communications traffic [Assignment: organization-defined frequency] for unusual or unauthorized activities or conditions.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-4(5)	INFORMATION SYSTEM MONITORING | SYSTEM-GENERATED ALERTS	The information system alerts [Assignment: organization-defined personnel or roles] when the following indications of compromise or potential compromise occur: [Assignment: organization-defined compromise indicators].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-4(10)	INFORMATION SYSTEM MONITORING | VISIBILITY OF ENCRYPTED COMMUNICATIONS	The organization makes provisions so that [Assignment: organization-defined encrypted communications traffic] is visible to [Assignment: organization-defined information system monitoring tools].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-4(11)	INFORMATION SYSTEM MONITORING | ANALYZE COMMUNICATIONS TRAFFIC ANOMALIES	The organization analyzes outbound communications traffic at the external boundary of the information system and selected [Assignment: organization-defined interior points within the system (e.g., subnetworks, subsystems)] to discover anomalies.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-4(12)	INFORMATION SYSTEM MONITORING | AUTOMATED ALERTS	The organization employs automated mechanisms to alert security personnel of the following inappropriate or unusual activities with security implications: [Assignment: organization-defined activities that trigger alerts].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-4(14)	INFORMATION SYSTEM MONITORING | WIRELESS INTRUSION DETECTION	The organization employs a wireless intrusion detection system to identify rogue wireless devices and to detect attack attempts and potential compromises/breaches to the information system.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-4(15)	INFORMATION SYSTEM MONITORING | WIRELESS TO WIRELINE COMMUNICATIONS	The organization employs an intrusion detection system to monitor wireless communications traffic as the traffic passes from wireless to wireline networks.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-4(16)	INFORMATION SYSTEM MONITORING | CORRELATE MONITORING INFORMATION	The organization correlates information from monitoring tools employed throughout the information system.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
SI-4(19)	INFORMATION SYSTEM MONITORING | INDIVIDUALS POSING GREATER RISK	The organization implements [Assignment: organization-defined additional monitoring] of individuals who have been identified by [Assignment: organization-defined sources] as posing an increased level of risk.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-4(20)	INFORMATION SYSTEM MONITORING | PRIVILEGED USER	The organization implements [Assignment: organization-defined additional monitoring] of privileged users.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-4(22)	INFORMATION SYSTEM MONITORING | UNAUTHORIZED NETWORK SERVICES	The information system detects network services that have not been authorized or approved by [Assignment: organization-defined authorization or approval processes] and [Selection (one or more): audits; alerts [Assignment: organization-defined personnel and/or roles]].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-4(23)	INFORMATION SYSTEM MONITORING | HOST-BASED DEVICES	The organization implements [Assignment: organization-defined host-based monitoring mechanisms] at [Assignment: organization-defined information system components].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-5	SECURITY ALERTS, ADVISORIES, AND DIRECTIVES	The organization: a. Receives information system security alerts, advisories, and directives from [Assignment: organization-defined external organizations] on an ongoing basis; b. Generates internal security alerts, advisories, and directives as deemed necessary; c. Disseminates security alerts, advisories, and directives to: [Selection (one or more): [Assignment: organization-defined personnel (identified by name and/or by role)]; [Assignment: organization-defined elements within the organization]; [Assignment: organization-defined external organizations]]; and d. Implements security directives in accordance with established time frames, or notifies the issuing organization of the degree of noncompliance.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-7	SOFTWARE, FIRMWARE, AND INFORMATION INTEGRITY	The organization employs integrity verification tools to detect unauthorized changes to [Assignment: organization-defined software, firmware, and information].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-7(1)	SOFTWARE, FIRMWARE, AND INFORMATION INTEGRITY | INTEGRITY CHECKS	The information system performs an integrity check of [Assignment: organization-defined software, firmware, and information] [Selection (one or more): at startup; at [Assignment: organization-defined transitional states or security-relevant events]; [Assignment: organization-defined frequency]].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-7(7)	SOFTWARE, FIRMWARE, AND INFORMATION INTEGRITY | INTEGRATION OF DETECTION AND RESPONSE	The organization incorporates the detection of unauthorized [Assignment: organization-defined security-relevant changes to the information system] into the organizational incident response capability.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-7(8)	SOFTWARE, FIRMWARE, AND INFORMATION INTEGRITY | AUDITING CAPABILITY FOR SIGNIFICANT EVENTS	The information system, upon detection of a potential integrity violation, provides the capability to audit the event and initiates the following actions: [Selection (one or more): generates an audit record; alerts current user; alerts [Assignment: organization-defined personnel or roles]; [Assignment: organization-defined other actions]].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-7(14)	SOFTWARE, FIRMWARE, AND INFORMATION INTEGRITY | BINARY OR MACHINE EXECUTABLE CODE	The organization: (a) Prohibits the use of binary or machine-executable code from sources with limited or no warranty and without the provision of source code; and (b) Provides exceptions to the source code requirement only for compelling mission/operational requirements and with the approval of the authorizing official.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-8	SPAM PROTECTION	The organization: a. Employs spam protection mechanisms at information system entry and exit points to detect and take action on unsolicited messages; and b. Updates spam protection mechanisms when new releases are available in accordance with organizational configuration management policy and procedures.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-8(1)	SPAM PROTECTION | CENTRAL MANAGEMENT	The organization centrally manages spam protection mechanisms.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-8(2)	SPAM PROTECTION | AUTOMATIC UPDATES	The information system automatically updates spam protection mechanisms.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-10	INFORMATION INPUT VALIDATION	The information system checks the validity of [Assignment: organization-defined information inputs].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-10(3)	INFORMATION INPUT VALIDATION | PREDICTABLE BEHAVIOR	The information system behaves in a predictable and documented manner that reflects organizational and system objectives when invalid inputs are received.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-11	ERROR HANDLING	The information system: a. Generates error messages that provide information necessary for corrective actions without revealing information that could be exploited by adversaries; and b. Reveals error messages only to [Assignment: organization-defined personnel or roles].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-12	INFORMATION HANDLING AND RETENTION	The organization handles and retains information within the information system and information output from the system in accordance with applicable federal laws, Executive Orders, directives, policies, regulations, standards, and operational requirements.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-16	MEMORY PROTECTION	The information system implements [Assignment: organization-defined security safeguards] to protect its memory from unauthorized code execution.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
SI-17	FAIL-SAFE PROCEDURES	The information system implements [Assignment: organization-defined fail-safe procedures] when [Assignment: organization-defined failure conditions occur].	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
PM-1	INFORMATION SECURITY PROGRAM PLAN	The organization: a. Develops and disseminates an organization-wide information security program plan that: 1. Provides an overview of the requirements for the security program and a description of the security program management controls and common controls in place or planned for meeting those requirements; 2. Includes the identification and assignment of roles, responsibilities, management commitment, coordination among organizational entities, and compliance; 3. Reflects coordination among organizational entities responsible for the different aspects of information security (i.e., technical, physical, personnel, cyber-physical); and 4. Is approved by a senior official with responsibility and accountability for the risk being incurred to organizational operations (including mission, functions, image, and reputation), organizational assets, individuals, other organizations, and the Nation; b. Reviews the organization-wide information security program plan [Assignment: organization-defined frequency]; c. Updates the plan to address organizational changes and problems identified during plan implementation or security control assessments; and d. Protects the information security program plan from unauthorized disclosure and modification.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PM-2	SENIOR INFORMATION SECURITY OFFICER	The organization appoints a senior information security officer with the mission and resources to coordinate, develop, implement, and maintain an organization-wide information security program.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PM-3	INFORMATION SECURITY RESOURCES	The organization: a. Ensures that all capital planning and investment requests include the resources needed to implement the information security program and documents all exceptions to this requirement; b. Employs a business case/Exhibit 300/Exhibit 53 to record the resources required; and c. Ensures that information security resources are available for expenditure as planned.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PM-4	PLAN OF ACTION AND MILESTONES PROCESS	The organization: a. Implements a process for ensuring that plans of action and milestones for the security program and associated organizational information systems: 1. Are developed and maintained; 2. Document the remedial information security actions to adequately respond to risk to organizational operations and assets, individuals, other organizations, and the Nation; and 3. Are reported in accordance with OMB FISMA reporting requirements. b. Reviews plans of action and milestones for consistency with the organizational risk management strategy and organization-wide priorities for risk response actions.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PM-5	INFORMATION SYSTEM INVENTORY	The organization develops and maintains an inventory of its information systems.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PM-6	INFORMATION SECURITY MEASURES OF PERFORMANCE	The organization develops, monitors, and reports on the results of information security measures of performance.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PM-7	ENTERPRISE ARCHITECTURE	The organization develops an enterprise architecture with consideration for information security and the resulting risk to organizational operations, organizational assets, individuals, other organizations, and the Nation.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PM-8	CRITICAL INFRASTRUCTURE PLAN	The organization addresses information security issues in the development, documentation, and updating of a critical infrastructure and key resources protection plan.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PM-9	RISK MANAGEMENT STRATEGY	The organization: a. Develops a comprehensive strategy to manage risk to organizational operations and assets, individuals, other organizations, and the Nation associated with the operation and use of information systems; b. Implements the risk management strategy consistently across the organization; and c. Reviews and updates the risk management strategy [Assignment: organization-defined frequency] or as required, to address organizational changes.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PM-10	SECURITY AUTHORIZATION PROCESS	The organization: a. Manages (i.e., documents, tracks, and reports) the security state of organizational information systems and the environments in which those systems operate through security authorization processes; b. Designates individuals to fulfill specific roles and responsibilities within the organizational risk management process; and c. Fully integrates the security authorization processes into an organization-wide risk management program.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PM-11	MISSION/BUSINESS PROCESS DEFINITION	The organization: a. Defines mission/business processes with consideration for information security and the resulting risk to organizational operations, organizational assets, individuals, other organizations, and the Nation; and b. Determines information protection needs arising from the defined mission/business processes and revises the processes as necessary, until achievable protection needs are obtained.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PM-12	INSIDER THREAT PROGRAM	The organization implements an insider threat program that includes a cross-discipline insider threat incident handling team.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PM-13	INFORMATION SECURITY WORKFORCE	The organization establishes an information security workforce development and improvement program.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.

Control Number	Control Title	Control Text	Status (Add, Remove, Generated)	Comments
PM-14	TESTING, TRAINING, AND MONITORING	The organization: a. Implements a process for ensuring that organizational plans for conducting security testing, training, and monitoring activities associated with organizational information systems: 1. Are developed and maintained; and 2. Continue to be executed in a timely manner; b. Reviews testing, training, and monitoring plans for consistency with the organizational risk management strategy and organization-wide priorities for risk response actions.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PM-15	CONTACTS WITH SECURITY GROUPS AND ASSOCIATIONS	The organization establishes and institutionalizes contact with selected groups and associations within the security community: a. To facilitate ongoing security education and training for organizational personnel; b. To maintain currency with recommended security practices, techniques, and technologies; and c. To share current security-related information including threats, vulnerabilities, and incidents.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.
PM-16	THREAT AWARENESS PROGRAM	The organization implements a threat awareness program that includes a cross-organization information-sharing capability.	Generated	Generated for LOW-MODERATE-MODERATE impact levels using DoD CCI generator.

Control Correlation Identifiers (CCI) List

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-000017	AC-2(3)	The information system automatically disables inactive accounts after an organization-defined time period.	DoD-Defined Enclave Designer Non-Designer Impractical	User Accounts	Impractical: The controller does not support inactive account disablement.
CCI-000018	AC-2(4)	The information system automatically audits account creation actions.	Enclave Designer Impractical	ACCESS CONTROL REQUIREMENTS; User Accounts	The auditing system, to the extent that one is provideed, will be configured to audit account modifications.
CCI-000039	AC-6(2)	The organization requires that users of information system accounts or roles, with access to organization-defined security functions or security-relevant information, use non-privileged accounts, or roles, when accessing nonsecurity functions.	DoD-Defined Designer Impractical	User Accounts; USER IDENTIFICATION AND AUTHENTICATION	The contractor ensures that the security system is implemented such that administrative or engineering functions addressing security are protected from non-privileged users. This level of implementation is dictated based on the limitations of the system.
CCI-000043	AC-7(a)	The organization defines the maximum number of consecutive invalid logon attempts to the information system by a user during an organization-defined time period.	DoD-Defined Designer Impractical	Unsuccessful Logon Attempts	Impractical; the control system is used for life safety. As such, it can not be locked out for any extended periods of time.
CCI-000044	AC-7(a)	The information system enforces the organization-defined limit of consecutive invalid logon attempts by a user during the organization-defined time period.	Designer	Unsuccessful Logon Attempts	Impractical; the control system is used for life safety. As such, it can not be locked out for any extended periods of time.
CCI-000048	AC-8(a)	The information system displays an organization-defined system use notification message or banner before granting access to the system that provides privacy and security notices consistent with applicable federal laws, Executive Orders, directives, policies, regulations, standards, and guidance.	Enclave Designer Impractical	System Use Notification	For networked devices with Remote User Interfaces which are capable, Contractor is required to configure the device to display a warning banner meeting the requirements of DTM 08-060 on screen. For Devices which are connected to a network and have a local user interface Contractor must ensure these display a warning banner meeting the requirements of DTM 08-060 on the user interface screen if capable of doing so and must have a permanently affixed label with an approved banner from DTM 08-060 if unable to display the warning banner on the screen. Where it is impractical (perhaps due to device size) to affix the label to the device, affix the label to the device enclosure.Labels must be machine printed or engraved, plastic or metal, designed for permanent installation, must use a font no smaller than 14 point, and must provide a high contrast between font and background colors All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06).
CCI-000050	AC-8(b)	The information system retains the notification message or banner on the screen until users acknowledge the usage conditions and take explicit actions to log on to or further access.	Enclave Designer	System Use Notification	For networked devices with Remote User Interfaces which are capable, Contractor is required to configure the device to display a warning banner meeting the requirements of DTM 08-060 on screen. For Devices which are connected to a network and have a local user interface Contractor must ensure these display a warning banner meeting the requirements of DTM 08-060 on the user interface screen if capable of doing so and must have a permanently affixed label with an approved banner from DTM 08-060 if unable to display the warning banner on the screen. Where it is impractical (perhaps due to device size) to affix the label to the device, affix the label to the device enclosure.Labels must be machine printed or engraved, plastic or metal, designed for permanent installation, must use a font no smaller than 14 point, and must provide a high contrast between font and background colors All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06).
CCI-000054	AC-10	The information system limits the number of concurrent sessions for each organization-defined account and/or account type to an organization-defined number of sessions.	DoD-Defined Designer	Session Lock and Session Termination Requirements	Impractical; Session Locking and Termination is not appropriate for Life Safety systems.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-000055	AC-10	The organization defines the maximum number of concurrent sessions to be allowed for each organization-defined account and/or account type.	Designer Non-Designer	Session Lock and Session Termination Requirements	Impractical; Session Locking and Termination is not appropriate for Life Safety systems.
CCI-000056	AC-11(b)	The information system retains the session lock until the user reestablishes access using established identification and authentication procedures.	Enclave Designer Impractical	Session Lock and Session Termination Requirements	Impractical; Session Locking and Termination is not appropriate for Life Safety systems.
CCI-000058	AC-11(a)	The information system provides the capability for users to directly initiate session lock mechanisms.	Enclave Designer Impractical	Session Lock and Session Termination Requirements	Impractical; Session Locking and Termination is not appropriate for Life Safety systems.
CCI-000059	AC-11(a)	The organization defines the time period of inactivity after which the information system initiates a session lock.	DoD-Defined Enclave Designer Impractical	Session Lock and Session Termination Requirements	Impractical; Session Locking and Termination is not appropriate for Life Safety systems.
CCI-000061	AC-14(a)	The organization identifies and defines organization-defined user actions that can be performed on the information system without identification or authentication consistent with organizational missions/business functions.	Designer	Permitted Actions Without Identification or Authentication	The control system must require identification and authentication before allowing any actions except read-only actions by a user acting from a user interface which MINIMALLY or FULLY supports accounts.
CCI-000123	AU-2(a)	The organization determines the information system must be capable of auditing an organization-defined list of auditable events.	Designer Non-Designer	Audit Events, Content of Audit Records, and Audit Generation;	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-000125	AU-2(c)	The organization provides a rationale for why the list of auditable events is deemed to be adequate to support after-the-fact investigations of security incidents.	Designer Non-Designer	Audit Events, Content of Audit Records, and Audit Generation;	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-000130	AU-3	The information system generates audit records containing information that establishes what type of event occurred.	Designer	Audit Events, Content of Audit Records, and Audit Generation;	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-000131	AU-3	The information system generates audit records containing information that establishes when an event occurred.	Designer	Audit Events, Content of Audit Records, and Audit Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-000132	AU-3	The information system generates audit records containing information that establishes where the event occurred.	Designer	Audit Events, Content of Audit Records, and Audit Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-000133	AU-3	The information system generates audit records containing information that establishes the source of the event.	Designer	Audit Events, Content of Audit Records, and Audit Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-000134	AU-3	The information system generates audit records containing information that establishes the outcome of the event.	Designer	Audit Events, Content of Audit Records, and Audit Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-000135	AU-3(1)	The information system generates audit records containing the organization-defined additional, more detailed information that is to be included in the audit records.	Designer Impractical	Audit Events, Content of Audit Records, and Audit Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-000154	AU-6(4)	The information system provides the capability to centrally review and analyze audit records from multiple components within the system.	Designer	Audit Reduction and Report Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-000158	AU-7(1)	The information system provides the capability to process audit records for events of interest based on organization-defined audit fields within audit records.	Enclave Designer Impractical	Audit Reduction and Report Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-000159	AU-8(a)	The information system uses internal system clocks to generate time stamps for audit records.	Designer	Audit Time Stamps	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-000166	AU-10	The information system protects against an individual (or process acting on behalf of an individual) falsely denying having performed organization-defined actions to be covered by non-repudiation.	Designer	Audit Events, Content of Audit Records, and Audit Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-000169	AU-12(a)	The information system provides audit record generation capability for the auditable events defined in AU-2 a at organization defined information system	Designer	Audit Events, Content of Audit Records, and Audit Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-000171	AU-12(b)	The information system allows organization-defined personnel or roles to select which auditable events are to be audited by specific components of the information	Designer Impractical	Audit Events, Content of Audit Records, and Audit Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-000172	AU-12(c)	The information system generates audit records for the events defined in AU-2 d with the content defined in AU-3.	Designer	Audit Events, Content of Audit Records, and Audit Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-000173	AU-12(1)	The organization defines the level of tolerance for relationship between time stamps of individual records in the audit trail that will be used for correlation.	Designer Non-Designer	CYBERSECURITY SOFTWARE; Auditing Front-End Software; Audit Reduction and Report Generation in MODERATE Systems.	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-000174	AU-12(1)	The information system compiles audit records from organization-defined information system components into a system-wide (logical or physical) audit trail that is time-correlated to within organization defined level of tolerance for relationship between time stamps of individual records in the audit trail.	Designer	Audit Reduction and Report Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-000176	IA-5(b)	The organization manages information system authenticators by establishing initial authenticator content for authenticators defined by the organization.	Designer Non-Designer	---	The organization is responsible for managing control system authenticators by establishing initial authenticator content for authenticators defined by the organization.
CCI-000182	IA-5(g)	The organization manages information system authenticators by changing/refreshing authenticators in accordance with the organization defined time period by authenticator type.	DoD-Defined Designer Non-Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	The organization is responsible for managing control system authenticators by changing/refreshing authenticators in accordance with the organization-defined time period by authenticator type. DoD has defined the time period as CAC - every 3 years, or 1 year from term of contract Password: 60 days Biometrics: every 3 years.
CCI-000185	IA-5(2)(a)	The information system, for PKI-based authentication validates certifications by constructing and verifying a certification path to an accepted trust anchor including checking certificate status information.	Enclave Designer Impractical	---	Impractical; PKI or Certificates are not supported in Fire and Life Safety controllers and equipment.
CCI-000186	IA-5(2)(b)	The information system, for PKI-based authentication enforces authorized access to the corresponding private key.	Enclave Designer	---	Impractical; PKI or Certificates are not supported in Fire and Life Safety controllers and equipment.
CCI-000187	IA-5(2)(c)	The information system, for PKI-based authentication, maps the authenticated identity to the account of the individual or group.	Enclave Designer	---	Impractical; PKI or Certificates are not supported in Fire and Life Safety controllers and equipment.
CCI-000192	IA-5(1)(a)	The information system enforces password complexity by the minimum number of upper case characters used.	Enclave Designer	USER IDENTIFICATION AND AUTHENTICATION	This is met by requiring the contractor to configure all controllers FULLY supporting accounts and supporting password-based authentication, and Passwords for Remote Interfaces to contain at least one uppercase character. Contractor is required to determine and apply all applicable STIGs/SRGs.
CCI-000193	IA-5(1)(a)	The information system enforces password complexity by the minimum number of lower case characters used.	Enclave Designer	USER IDENTIFICATION AND AUTHENTICATION	This is met by requiring the contractor to configure all controllers FULLY supporting accounts and supporting password-based authentication, and Passwords for Remote Interfaces to contain at least one lowercase character. Contractor is required to determine and apply all applicable STIGs/SRGs.
CCI-000194	IA-5(1)(a)	The information system enforces password complexity by the minimum number of numeric characters used.	Enclave Designer	USER IDENTIFICATION AND AUTHENTICATION	This is met by requiring the contractor to configure all controllers FULLY supporting accounts and supporting password-based authentication, and Passwords for Remote Interfaces to contain at least one numeric character. Contractor is required to determine and apply all applicable STIGs/SRGs.
CCI-000195	IA-5(1)(b)	The information system, for password-based authentication, when new passwords are created, enforces that at least an organization-defined number of characters are changed.	Enclave Designer	USER IDENTIFICATION AND AUTHENTICATION	This is met by requiring the contractor to configure all controllers FULLY supporting accounts and supporting password-based authentication, and Passwords for Remote Interfaces to ensure that all password must differ from previous five (5) passwords, where differ is defined as changing at least fifty percent of the characters. Contractor is required to determine and apply all applicable STIGs/SRGs.
CCI-000196	IA-5(1)(c)	The information system, for password-based authentication, stores only cryptographically-protected passwords.	Enclave Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	This is met by requiring the contractor to configure all controllers FULLY supporting accounts and supporting password-based authentication, and Passwords for Remote Interfaces are cryptographically protected during storage and transmission. Contractor is required to determine and apply all applicable STIGs/SRGs.
CCI-000197	IA-5(1)(c)	The information system, for password-based authentication, transmits only cryptographically-protected passwords.	Enclave Designer	USER IDENTIFICATION AND AUTHENTICATION	This is met by requiring the contractor to configure all controllers FULLY supporting accounts and supporting password-based authentication, and Passwords for Remote Interfaces are cryptographically protected during storage and transmission. Contractor is required to determine and apply all applicable STIGs/SRGs.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-000198	IA-5(1)(d)	The information system enforces minimum password lifetime restrictions.	Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	Not applicable at the controller; This is managed at PIT L2 computer or above which allows for minimum lifetime of 24 hours which allows the use of a temporary password for system logons with an immediate change to a permanent password.
CCI-000199	IA-5(1)(d)	The information system enforces maximum password lifetime restrictions.	Enclave Designer	USER IDENTIFICATION AND AUTHENTICATION	This is met by requiring the contractor to configure all controllers FULLY supporting accounts and supporting password-based authentication, and Passwords for Remote Interfaces to ensure that passwords have a maximum lifetime of 60 days. Contractor is required to determine and apply all applicable STIGs/SRGs
CCI-000200	IA-5(1)(e)	The information system prohibits password reuse for the organization defined number of generations.	Enclave Designer Non-Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	This is met by requiring the contractor to configure all controllers FULLY supporting accounts and supporting password-based authentication, and Passwords for Remote Interfaces to ensure that all password must differ from previous five (5) passwords, where differ is defined as changing at least fifty percent of the characters. Contractor is required to determine and apply all applicable STIGs/SRGs.
CCI-000205	IA-5(1)(a)	The information system enforces minimum password length.	Enclave Designer	USER IDENTIFICATION AND AUTHENTICATION	This is met by requiring the contractor to configure controllers FULLY supporting accounts and supporting password-based authentication, and Passwords for Remote Interfaces to have a minimum password length of 15 characters and for controllers Minimally Supporting Accounts must support passwords with a minimum length of four characters. Contractor is required to determine and apply all applicable STIGs/SRGs.
CCI-000206	IA-6	The information system obscures feedback of authentication information during the authentication process to protect the information from possible exploitation/use by unauthorized individuals.	Enclave Designer Impractical	Authenticator Feedback	This is addressed by requiring the contractor to employ devices that do not show authentication information on a display. Devices that momentarily display a character as it is entered are acceptable. For devices that have STIGs or SRGs related to CCI-000206 will comply with those requirements.
CCI-000207	PM-5	The organization develops and maintains an inventory of its information systems.	Designer Non-Designer Impractical	Control System Inventory Report	This is met requiring the contractor to complete a Control System Inventory report using the most current Inventory Spreadsheet listed at the www.wbdg.org documenting all devices, including networked devices, network infrastructure devices, non-networked devices, input devices (e.g. sensors) and output devices (e.g. actuators) that includes all components withing the authorization boundary of the system. Contractor is required that for each device, they must provide all applicable information for which there is a field on the spreadsheet in accordance with the instructions on the spreadsheet. The organization is responsible for registering and maintaining their control systems in DITPR.
CCI-000217	AC-2(3)	The organization defines a time period after which inactive accounts are automatically disabled.	DoD-Defined Designer Impractical	User Accounts	Impractical; The control system does not support this functionality.
CCI-000232	AC-14(b)	The organization documents and provides supporting rationale in the security plan for the information system, user actions not requiring identification and authentication.	Designer	Permitted Actions Without Identification or Authentication	The control system must require identification and authentication before allowing any actions except read-only actions by a user acting from a user interface which MINIMALLY or FULLY supports accounts.
CCI-000236	PM-11(b)	The organization determines information protection needs arising from the defined mission/business processes and revises the processes as necessary, until an achievable set of protection needs are obtained.	Enclave Designer Non-Designer	Control System Cybersecurity Documentation	The organization is responsible for determining information protection needs arising from the defined mission/business processes and revises the processes as necessary, until an achievable set of protection needs are obtained.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-000258	CA-3(b)	The organization documents, for each interconnection, the interface characteristics.	Enclave Designer Non-Designer	Cybersecurity Interconnection Schedule; CYBERSECURITY DURING CONSTRUCTION	This is met by requiring the contractor to meet Cybersecurity Requirements during Construction. Contractor is required to document, for each interconnection, the interface characteristics for each interconnection for any and all Contractor Computer Equipment, (e.g., OS, Anti-Malware Software, Passwords/Phrases, User-Based Authentication, any temporary IP networks if used, network connections, boundaries etc. as part of the requirements for CYBERSECURITY DURING CONSTRUCTION. Contractor is also required to provide a completed Cybersecurity Interconnection Schedule documenting network connections between the installed system and other systems including information for each device directly communicating between systems: Device Identifier, Device Description, Transport layer Protocol, Network Address, Port (if applicable), MAC (Layer 2) address (if applicable), Media, Application Protocol, Service (if applicable), Descriptive Purpose of communication. The organization is responsible to document any Interconnection security agreements which are required for systems connecting between enclaves which can include both DoD enclaves or non DoD enclaves.
CCI-000293	CM-2	The organization develops and documents a current baseline configuration of the information system.	Designer	---	This is met by requiring the Contractor to provide all baseline Control System Cybersecurity Documentation at project end for all Control System, subsystems, and devices. The Government organization is responsible to continue to develop and document current baseline configuration of the control system, subsystem and devices throughout the lifecycle of the control system.
CCI-000298	CM-2(1)(c)	The organization reviews and updates the baseline configuration of the information system as an integral part of information system component installations.	Designer Non-Designer	---	This is met by requiring the Contractor to provide all baseline Control System Cybersecurity Documentation at project end for all Control System, subsystems, and devices. The Government organization is responsble to review and update the baseline configuration of the system as an integral part of control system component installations, and to document each occurrence of these reviews and update all actions as an audit trail upon final acceptance of the system
CCI-000349	CM-5(2)	The organization reviews information system changes per organization defined frequency to determine whether unauthorized changes have occurred.	Designer Non-Designer	---	Non-Designer; The organization is responsible to address this control.
CCI-000363	CM-6(a)	The organization defines security configuration checklists to be used to establish and document configuration settings for the information system technology products employed.	Designer	REQUIREMENTS FOR LEAST FUNCTIONALITY	Do not provide devices with remote user interfaces or with full user interfaces where one is not required. Do not use a networked sensor or actuator where a non-networked sensor or actuator would suffice. Unless specifically required by the government, do not provide a capability to update device firmware over the network.
CCI-000364	CM-6(a)	The organization establishes configuration settings for information technology products employed within the information system using organization-defined security configuration checklists.	Designer	REQUIREMENTS FOR LEAST FUNCTIONALITY	Do not provide devices with remote user interfaces or with full user interfaces where one is not required. Do not use a networked sensor or actuator where a non-networked sensor or actuator would suffice. Unless specifically required by the government, do not provide a capability to update device firmware over the network.
CCI-000365	CM-6(a)	The organization documents configuration settings for information technology products employed within the information system using organization-defined security configuration checklists that reflect the most restrictive mode consistent with operational requirements.	DoD-Defined Designer Non-Designer Impractical	REQUIREMENTS FOR LEAST FUNCTIONALITY	DoD Components are automatically compliant with this CCI because they are covered by the DoD level security configuration or implementation guidance (e.g. STIGs, SRGs, NSA configuration guides, CTOs, DTMs etc.).
CCI-000380	CM-7(b)	The organization defines for the information system prohibited or restricted functions, ports, protocols, and/or services.	Designer	IP Control Networks;	Impractical; controllers do not have IP functionality.
CCI-000381	CM-7(a)	The organization configures the information system to provide only essential capabilities.	Designer	IP Control Networks;	Impractical; controllers do not have IP functionality.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-000382	CM-7(b)	The organization configures the information system to prohibit or restrict the use of organization-defined functions, ports, protocols, and/or services.	Designer	IP Control Networks;	Impractical; controllers do not have IP functionality.
CCI-000388	CM-7(3)	The organization ensures compliance with organization-defined registration requirements for functions, ports, protocols, and services.	Designer Non-Designer	Network Communication Report	This is met by requiring the contractor to provide a network communication report. For each networked device, contractor is to Ensure that all functions, ports, protocols, and services to be used have been assessed and planned for according DODI 8551.01, and that any unused port or interface not directly related to the full functionality of the control system has been disabled. Contractor must document the communication characteristics of the device including communication protocols, services used, encryption employed, and a general description of what information is communicated over the network. For non-IP communications, contractor is required to document communication protocol and media used. Contractor must include all documentation of these functions, ports, protocol and services as being disabled as part of the final Control System Cybersecurity Documentation submittal.
CCI-000389	CM-8(a)(1)	The organization develops and documents an inventory of information system components that accurately reflects the current information system.	Designer	Control System Inventory Report	The organization identifies the organization-defined software programs authorized to execute on the information system.
CCI-000392	CM-8(a)(2)	The organization develops and documents an inventory of information system components that includes all components within the authorization boundary of the information system.	Designer	Control System Inventory Report	The contractor is responsible for providing a Pre-Construction Control System Inventory Report and a Final Control System Inventory Report, using the Inventory Spreadsheet listed under the 25 05 11.XX at https://www.wbdg.org/dod/ufgs/ufgs-25-05-11. In the Control System Inventory Reports, document all devices, including networked devices, network infrastructure devices, non-networked devices, input devices (e.g. sensors) and output devices (e.g. actuators). For each device provide all applicable information for which there is a field on the spreadsheet in accordance with the instructions on the spreadsheet.
CCI-000398	CM-8(a)(4)	The organization defines information deemed necessary to achieve effective information system component accountability.	DoD-Defined Designer Non-Designer Impractical	Control System Inventory Report	The contractor is responsible for providing a Pre-Construction Control System Inventory Report and a Final Control System Inventory Report, using the Inventory Spreadsheet listed under the 25 05 11.XX at https://www.wbdg.org/dod/ufgs/ufgs-25-05-11. In the Control System Inventory Reports, document all devices, including networked devices, network infrastructure devices, non-networked devices, input devices (e.g. sensors) and output devices (e.g. actuators). For each device provide all applicable information for which there is a field on the spreadsheet in accordance with the instructions on the spreadsheet.
CCI-000411	CM-8(2)	The organization employs automated mechanisms to help maintain an up-to-date inventory of information system components.	Designer Non-Designer	Control System Inventory Report Control System Cybersecurity Documentation	The contractor is responsible for providing a Pre-Construction Control System Inventory Report and a Final Control System Inventory Report, using the Inventory Spreadsheet listed under the 25 05 11.XX at https://www.wbdg.org/dod/ufgs/ufgs-25-05-11. In the Control System Inventory Reports, document all devices, including networked devices, network infrastructure devices, non-networked devices, input devices (e.g. sensors) and output devices (e.g. actuators). For each device provide all applicable information for which there is a field on the spreadsheet in accordance with the instructions on the spreadsheet. The organization is responsible for employing automated mechanisms to help maintain an up-to-date inventory of control system components.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-000412	CM-8(2)	The organization employs automated mechanisms to help maintain a complete inventory of information system components.	Designer Non-Designer	Control System Inventory Report Control System Cybersecurity Documentation	The contractor is responsible for providing a Pre-Construction Control System Inventory Report and a Final Control System Inventory Report, using the Inventory Spreadsheet listed under the 25 05 11.XX at https://www.wbdg.org/dod/ufgs/ufgs-25-05-11. In the Control System Inventory Reports, document all devices, including networked devices, network infrastructure devices, non-networked devices, input devices (e.g. sensors) and output devices (e.g. actuators). For each device provide all applicable information for which there is a field on the spreadsheet in accordance with the instructions on the spreadsheet. The organization is responsible for employing automated mechanisms to help maintain a complete inventory of control system components.
CCI-000553	CP-10(2)	The information system implements transaction recovery for systems that are transaction-based.	Designer	---	For all controllers, the contractor is responsible for providing a backup of the controller configuration and the source code for all loaded application programs (all software that is not common to every controller of the same manufacturer and model). The organization is responsible for maintaining control system component backups and for documenting transaction recovery results as part of contingency plan testing.
CCI-000623	SA-4(1)	The organization requires the developer of the information system, system component, or information system service to provide a description of the functional properties of the security controls to be employed.	Designer Non-Designer Impractical	---	This is met by implementation of the Cybersecurity Design Process as required by UFC 4-010-06 with the provision of the appropriate 25 05 11.XX UFGS Specification for the identified Control System(s). Then, the Contractor is required to provide baseline Control System Cybersecurity Documentation at project end for all Control System, subsystems, and devices as a submittal requirement .
CCI-000692	SA-10(c)	The organization requires the developer of the information system, system component, or information system service to implement only organization-approved changes to the system, component, or service.	Designer Non-Designer Impractical	---	This is met by implementation of the Cybersecurity Design Process as required by UFC 4-010-06 with the provision of the appropriate 25 05 11.XX UFGS Specification for the identified Control System(s). Then, the Contractor is required to provide baseline Control System Cybersecurity Documentation at project end for all Control System, subsystems, and devices as a submittal requirement.
CCI-000694	SA-10(d)	The organization requires the developer of the information system, system component, or information system service to document approved changes to the system, component, or service.	Designer Non-Designer Impractical	---	This is met by implementation of the Cybersecurity Design Process as required by UFC 4-010-06 with the provision of the appropriate 25 05 11.XX UFGS Specification for the identified Control System(s). Then, the Contractor is required to provide baseline Control System Cybersecurity Documentation at project end for all Control System, subsystems, and devices as a submittal requirement.
CCI-000764	IA-2	The information system uniquely identifies and authenticates organizational users (or processes acting on behalf of organizational users).	Enclave Designer Impractical	User Accounts; USER IDENTIFICATION AND AUTHENTICATION	Impractical; The control system is unable to authenticate organizational users.
CCI-000765	IA-2(1)	The information system implements multifactor authentication for network access to privileged accounts.	Enclave Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	Impractical; The control system is unable to authenticate users via multi-factor methods.
CCI-000766	IA-2(2)	The information system implements multifactor authentication for network access to non-privileged accounts.	Enclave Designer Impractical	---	Impractical; The control system is unable to authenticate users via multi-factor methods.
CCI-000767	IA-2(3)	The information system implements multifactor authentication for local access to privileged accounts.	Enclave Designer Impractical	---	Impractical; The control system is unable to authenticate users via multi-factor methods.
CCI-000768	IA-2(4)	The information system implements multifactor authentication for local access to non-privileged accounts.	Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	Impractical; The control system is unable to authenticate users via multi-factor methods.
CCI-000777	IA-3	The organization defines a list of specific and/or types of devices for which identification and authentication is required before establishing a connection to the information system.	DoD-Defined Enclave Designer Impractical	Control System Inventory Report; Device Identification and Authentication	Impractical; The controller does not support functions such as mobile devices or network connected endpoints. The system is closed.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-000778	IA-3	The information system uniquely identifies an organization defined list of specific and/or types of devices before establishing a local, remote, or network connection.	Enclave Designer Impractical	Control System Inventory Report; Device Identification and Authentication	Impractical; The controller does not support functions such as mobile devices or network connected endpoints. The system is closed.
CCI-000803	IA-7	The information system implements mechanisms for authentication to a cryptographic module that meet the requirements of applicable federal laws, Executive Orders, directives, policies, regulations, standards, and guidance for such authentication.	Enclave Designer Impractical	Cryptographic Module Authentication	Impractical; The control system is closed and proprietary and does not support external cryptographic modules.
CCI-000865	MA-3	The organization approves information system maintenance tools.	Designer Non-Designer	SYSTEM MAINTENANCE TOOL SOFTWARE	The contractor must obtain permission from the government for each maintenance tool the contractor wants to employ.
CCI-000928	PE-3(1)	The organization enforces physical access authorizations to the information system in addition to the physical access controls for the facility at organization-defined physical spaces containing one or more components of the information system.	Designer Non-Designer	Physical Security	The organization enforces physical access authorizations to the control system in addition to the physical access controls for the facility at organization-defined physical spaces containing one or more components of the information system. The organization will ensure that these controls are separate from and independent of, the physical access controls established for the facility.
CCI-000936	PE-4	The organization controls physical access to organization-defined information system distribution and transmission lines within organizational facilities using organization-defined security safeguards.	Designer Non-Designer	Physical Security	The organization enforces physical access authorizations to the control system in addition to the physical access controls for the facility at organization-defined physical spaces containing one or more components of the information system. The organization will ensure that these controls are separate from and independent of, the physical access controls established for the facility.
CCI-001048	RA-3(a)	The organization conducts an assessment of risk of the information system and the information it processes, stores, or transmits that includes the likelihood and magnitude of harm from the unauthorized access, use, disclosure, disruption, modification, or destruction.	Designer Non-Designer	Control System Cybersecurity Documentation	This is met by implementation of the Cybersecurity Design Process as required by UFC 4-010-06. The organization is responsible to conduct a risk of the system and the information it processes, stores, or transmits that includes the likelihood and magnitude of harm from the unauthorized access, use, disclosure, disruption, modification, or destruction which is then documented by the Designer as per Section 3-1.1 Five Steps for Cybersecurity Design. This risk is revised during this processes as necessary, until the completion of the Design Review by the Government at the 35% Design Deliverable. The Design process concludes with the provision of the appropriate 25 05 11.XX UFGS Specification for the identified Control System(s) in which the Contractor will be required to provide baseline Control System Cybersecurity Documentation at project end for all Control System, subsystems, and devices.
CCI-001054	RA-5(a)	The organization scans for vulnerabilities in the information system and hosted applications on an organization-defined frequency.	Enclave Designer Non-Designer	VULNERABILITY SCANNING	Impractical; The controller does not support this level of functionality. The controller is not connected to an IP network.
CCI-001055	RA-5(a)	The organization defines a frequency for scanning for vulnerabilities in the information system and hosted applications.	DoD-Defined Enclave Designer Impractical	VULNERABILITY SCANNING	Impractical; The controller does not support this level of functionality. The controller is not connected to an IP network.
CCI-001056	RA-5(a)	The organization scans for vulnerabilities in the information system and hosted applications when new vulnerabilities potentially affecting the system/applications are identified and reported.	Enclave Designer Non-Designer	VULNERABILITY SCANNING	Impractical; The controller does not support this level of functionality. The controller is not connected to an IP network.
CCI-001057	RA-5(b)	The organization employs vulnerability scanning tools and techniques that facilitate interoperability among tools and automate parts of the vulnerability management process by using standards for: enumerating platforms, software flaws, and improper configurations; formatting checklists and test procedures; and measuring vulnerability impact.	Enclave Designer Non-Designer Impractical	VULNERABILITY SCANNING	Impractical; The controller does not support this level of functionality. The controller is not connected to an IP network.
CCI-001058	RA-5(c)	The organization analyzes vulnerability scan reports and results from security control assessments.	Enclave Designer Non-Designer	VULNERABILITY SCANNING	Impractical; The controller does not support this level of functionality. The controller is not connected to an IP network.
CCI-001059	RA-5(d)	The organization remediates legitimate vulnerabilities in organization-defined response times in accordance with an organizational assessment risk.	Enclave Designer Non-Designer Impractical	VULNERABILITY SCANNING	Impractical; The controller does not support this level of functionality. The controller is not connected to an IP network.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-001062	RA-5(1)	The organization employs vulnerability scanning tools that include the capability to readily update the information system vulnerabilities to be scanned.	Enclave Designer	DATABASE AND WEB SERVER SOFTWARE; VULNERABILITY SCANNING	Impractical; The controller does not support this level of functionality. The controller is not connected to an IP network.
CCI-001067	RA-5(5)	The information system implements privileged access authorization to organization-identified information system components for selected organization-defined vulnerability scanning activities.	Enclave Designer	DATABASE AND WEB SERVER SOFTWARE; VULNERABILITY SCANNING	Impractical; The controller does not support this level of functionality. The controller is not connected to an IP network.
CCI-001082	SC-2	The information system separates user functionality (including user interface services) from information system management functionality.	Enclave Designer Non-Designer	Denial of Service Protection	To the greatest extent practical, implement control logic without reliance on the network. Except for networked input and outputs on input-output buses specifically designed to provide high reliability or redundancy, sensors and actuators must not rely on the network to exchange data with the controller executing the sequence of operation which uses the sensor value or determines the actuator command. Sensor values required by multiple devices may be shared over the network provided they are connected to a controller requiring the value for execution of the sequence and that controller shares the value on the network.
CCI-001097	SC-7(a)	The information system monitors and controls communications at the external boundary of the system and at key internal boundaries within the system.	DoD-Defined Enclave Designer Impractical	Physical Security; Denial of Service Protection	The system is protected by requiring the contractor to install and implement all of the system components within lockable enclosures. Additional levels of monitoring is not possible.
CCI-001109	SC-7(5)	The information system at managed interfaces denies network communications traffic by default and allows network communications traffic by exception (i.e., deny all, permit by exception).	Enclave Designer	Cybersecurity Interconnection Schedules; Physical Security; Process Isolation and Boundary Protection	Impractical; The system is not connected to an IP network and only functions using its proprietary, closed communications network. The ability to employ a firewall in this application is not possible.
CCI-001120	SC-7(13)	The organization defines key information security tools, mechanisms, and support components to be isolated.	Enclave Designer Non-Designer	Process Isolation and Boundary Protection	The organization is responsible for defining key information security tools, mechanisms, and support components to be isolated. When radios interfacing a local fire protection system to a supervisory system are not NIST FIPS 140-2 validated, use a relay panel interface between the local fire protection system and the radio. Install and configure the relay panel to prohibit initiating any action within the local fire protection system other than causing the system to play a pre-recorded message. Install relays using the normally closed contact such that they pass a signal when they open, and so that a relay that loses power or has a failed coil passes the signal. For fire suppression systems including a release panel, any network used in these systems must be dedicated to these systems and must be isolated from any other network, including other components of the Fire Alarm and Fire Suppression systems. Use only dry contacts and relays to transfer signals from these systems to any other systems. Install relays using the normally closed contact such that they pass a signal when they open, and so that a relay that loses power or has a failed coil passes the signal.
CCI-001126	SC-7(18)	The information system fails securely in the event of an operational failure of a boundary protection device.	Designer Impractical	Cybersecurity Interconnection Schedule Process Isolation and Boundary Protection	The control system fails as defined by the NFPA requirements.
CCI-001133	SC-10	The information system terminates the network connection associated with a communications session at the end of the session or after an organization-defined time period of inactivity.	Enclave Designer Impractical	Session Lock and Session Termination	Impractical; Session Locking and Termination is not appropriate for Life Safety systems.
CCI-001134	SC-10	The organization defines the time period of inactivity after which the information system terminates a network connection associated with a communications session.	DoD-Defined Designer Impractical	Session Lock and Session Termination	Impractical; Session Locking and Termination is not appropriate for Life Safety systems.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-001160	SC-18(a)	The organization defines acceptable and unacceptable mobile code and mobile code technologies.	Enclave Designer	Mobile Code	Impractical; the Fire and Life Safety device(s) do not support mobile code.
CCI-001161	SC-18(b)	The organization establishes usage restrictions for acceptable mobile code and mobile code technologies.	Enclave Designer	Mobile Code	Impractical; the Fire and Life Safety device(s) do not support mobile code.
CCI-001162	SC-18(b)	The organization establishes implementation guidance for acceptable mobile code and mobile code technologies.	Enclave Designer	Mobile Code	Impractical; the Fire and Life Safety device(s) do not support mobile code.
CCI-001163	SC-18(c)	The organizations authorizes the use of mobile code within the information system.	Enclave Designer	Mobile Code	Impractical; the Fire and Life Safety device(s) do not support mobile code.
CCI-001164	SC-18(c)	The organization monitors the use of mobile code within the information system.	Enclave Designer	Mobile Code	Impractical; the Fire and Life Safety device(s) do not support mobile code.
CCI-001165	SC-18(c)	The organization controls the use of mobile code within the information system.	Enclave Designer	Mobile Code	Impractical; the Fire and Life Safety device(s) do not support mobile code.
CCI-001166	SC-18(1)	The information system identifies organization-defined unacceptable mobile code.	Enclave Designer Non-Designer	Mobile Code	Impractical; the Fire and Life Safety device(s) do not support mobile code.
CCI-001169	SC-18(3)	The information system prevents the download of organization-defined unacceptable mobile code.	Designer Non-Designer	Mobile Code	Impractical; the Fire and Life Safety device(s) do not support mobile code.
CCI-001170	SC-18(4)	The information system prevents the automatic execution of mobile code in organization-defined software applications.	Designer	Mobile Code	Impractical; the Fire and Life Safety device(s) do not support mobile code.
CCI-001184	SC-23	The information system protects the authenticity of communications sessions.	Enclave Designer Impractical	Device Identification and Authentication	Communications within the system performs it's own communications management and failure notification. This is performed via 'Trouble' indications. External communications is not performed using the session methodology. Session failures will result in pre-configured responses.
CCI-001185	SC-23(1)	The information system invalidates session identifiers upon user logout or other session termination.	Designer	Cryptographic Protection	The controller is not IP network connected. The controller will apply its own disconnection process upon user logout. External connection to the device is not possible for remote users.
CCI-001188	SC-23(3)	The information system generates unique session identifiers for each session with organization-defined randomness requirements.	Designer	Cryptographic Protection	The controller is not IP network connected. The controller will apply its own disconnection process upon user logout. External connection to the device is not possible for remote users.
CCI-001190	SC-24	The information system fails to an organization-defined known-state for organization-defined types of failures.	Designer	---	The control system will fail to a NFPA defined safe state. Any system failures will result in the system indicating an alarm notification and emergency personnel notified.
CCI-001191	SC-24	The organization defines the known states the information system should fail to in the event of a organization-defined system failure.	DoD-Defined Designer Impractical	---	The organization is responsible for defining the known states the control system should fail to in the event of a organization-defined system failure.
CCI-001192	SC-24	The organization defines types of failures for which the information system should fail to an organization-defined known state.	DoD-Defined Designer Impractical	---	The organization is responsible for defining the types of failures for which the control system should fail to an organization-defined known state.
CCI-001193	SC-24	The organization defines system state information that should be preserved in the event of a system failure.	DoD-Defined Designer Impractical	---	The organization is responsible for defining system state information that should be preserved in the event of a system failure.
CCI-001199	SC-28	The information system protects the confidentiality and/or integrity of organization-defined information at rest.	Enclave Designer Impractical	Protection of Information at Rest	Impractical; The system maintains no historical information. The system natively is intended to only react to immediate information.
CCI-001241	SI-3(c)(1)	The organization configures malicious code protection mechanisms to perform periodic scans of the information system on an organization-defined frequency.	Enclave Designer Non-Designer	Malicious Code Protection	Impractical; In isolated systems without a computer there scanning from a central source is not possible. Additionally, disconnected systems do not have the ability to update definition files.
CCI-001253	SI-4(a)(1)	The organization defines the objectives of monitoring for attacks and indicators of potential attacks on the information system.	DoD-Defined Enclave Designer Impractical	Malicious Code Protection	Impractical; The system is not IP-network connected, automated monitoring tools are unable to monitor the system.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-001310	SI-10	The information system checks the validity of organization-defined inputs.	Designer Non-Designer	---	This CCI involves checking the syntax and semantics of the inputs, ensuring they match the specified definitions for format and content. See the UFGS 25 05 11 Notes for this section. This is partially met by requiring the contractor to add redundant sensors where sensed values are critical inputs to the sequence. Contractor is required to have confirmation dialogs prior to user input when this user input which could have serious adverse impact on the system and/or should configure the controller to ensure user inputs require validation by an additional user prior to input. Contractor to determine and apply all applicable STIGs and/or SRGs.
CCI-001312	SI-11(a)	The information system generates error messages that provide information necessary for corrective actions without revealing information that could be exploited by adversaries.	Designer	---	This CCI involves checking the syntax and semantics of the inputs, ensuring they match the specified definitions for format and content and that all error messages, provide information necessary for corrective actions without revealing information that could be exploited by adversaries.
CCI-001361	AC-2(2)	The organization defines a time period after which temporary accounts are automatically terminated.	DoD-Defined Enclave Designer Non-Designer Impractical	User Accounts	Impractical; the controller does not support Temporary accounts.
CCI-001365	AC-2(2)	The organization defines a time period after which emergency accounts are automatically terminated.	DoD-Defined Enclave Designer Non-Designer Impractical	---	Impractical; the controller does not support emergency accounts.
CCI-001368	AC-4	The information system enforces approved authorizations for controlling the flow of information within the system based on organization-defined information flow control policies.	Enclave Designer Impractical	Information Flow Enforcement	Impractical; the controller is part of a single vendor Life Safety system. Information flow is controlled and restricted to only that required by the system.
CCI-001403	AC-2(4)	The information system automatically audits account modification actions.	Enclave Designer Impractical	Audit Events, Content of Audit Records, and Audit Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-001404	AC-2(4)	The information system automatically audits account disabling actions.	Enclave Designer Impractical	Audit Events, Content of Audit Records, and Audit Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-001405	AC-2(4)	The information system automatically audits account removal actions.	Enclave Designer Impractical	Audit Events, Content of Audit Records, and Audit Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-001414	AC-4	The information system enforces approved authorizations for controlling the flow of information between interconnected systems based on organization-defined information flow control policies.	Enclave Designer Impractical	Information Flow Enforcement	Impractical; the controller is part of a single vendor Life Safety system. Information flow is controlled and restricted to only that required by the system.
CCI-001419	AC-6(2)	The organization defines the security functions or security-relevant information to which users of information system accounts, or roles, have access.	DoD-Defined Designer Impractical	User Accounts; USER IDENTIFICATION AND AUTHENTICATION	The contractor ensures that the security system is implemented such that administrative or engineering functions addressing security are protected from non-privledged users. This level of implementation is disctated based on the limitations of the system.
CCI-001423	AC-7(a)	The organization defines the time period in which the organization-defined maximum number of consecutive invalid logon attempts occur.	DoD-Defined Designer Impractical	Unsuccessful Logon Attempts	Impractical; the control system is used for life safety. As such, it can not be locked out for any extended periods of time.
CCI-001438	AC-18(a)	The organization establishes usage restrictions for wireless access.	Designer Non-Designer	Wireless and Wired Broadcast Communication	The use of wireless and wired broadcast communication for fire protection systems within a facility is prohibited. Wireless communication may be used to provide communication from the fire protection system in a facility to the central monitoring station.
CCI-001439	AC-18(a)	The organization establishes implementation guidance for wireless access.	Designer Non-Designer	Wireless and Wired Broadcast Communication	The use of wireless and wired broadcast communication for fire protection systems within a facility is prohibited. Wireless communication may be used to provide communication from the fire protection system in a facility to the central monitoring station.
CCI-001441	AC-18(b)	The organization authorizes wireless access to the information system prior to allowing such connections.	Designer Non-Designer	Wireless and Wired Broadcast Communication	The use of wireless and wired broadcast communication for fire protection systems within a facility is prohibited. Wireless communication may be used to provide communication from the fire protection system in a facility to the central monitoring station.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-001443	AC-18(1)	The information system protects wireless access to the system using authentication of users and/or devices.	Designer Impractical	---	The use of wireless and wired broadcast communication for fire protection systems within a facility is prohibited. Wireless communication may be used to provide communication from the fire protection system in a facility to the central monitoring station.
CCI-001444	AC-18(1)	The information system protects wireless access to the system using encryption.	Designer Impractical	---	Impractical; there is no requirement to implement encryption for Fire & Life Safety communications between the facility and the Fire Alarm Reporting System (FARS).
CCI-001449	AC-18(3)	The organization disables, when not intended for use, wireless networking capabilities internally embedded within information system components prior to issuance and deployment.	Designer	---	Non-Designer; The organization is responsible to disable, when not intended for use, wireless networking capabilities internally embedded within control system components prior to issuance and deployment.
CCI-001459	AU-12(a)	The organization defines information system components that provide audit record generation capability.	DoD-Defined Designer Impractical	Audit Events, Content of Audit Records, and Audit Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-001462	AU-14(2)	The information system provides the capability for authorized users to capture/record and log content related to a user session.	Designer Non-Designer	Audit Events, Content of Audit Records, and Audit Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-001464	AU-14(1)	The information system initiates session audits at system start-up.	Designer Non-Designer	Audit Events, Content of Audit Records, and Audit Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-001485	AU-2(d)	The organization defines the events which are to be audited on the information system on an organization-defined frequency of (or situation requiring) auditing for each identified event.	Designer Non-Designer	Audit Events, Content of Audit Records, and Audit Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-001487	AU-3	The information system generates audit records containing information that establishes the identity of any individuals or subjects associated with the event.	Designer Impractical	Audit Events, Content of Audit Records, and Audit Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-001488	AU-3(1)	The organization defines additional, more detailed information to be included in the audit records.	Designer Non-Designer	Audit Events, Content of Audit Records, and Audit Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-001544	IA-5(c)	The organization manages information system authenticators by ensuring that authenticators have sufficient strength of mechanism for their intended use.	Designer Non-Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	This is met by the contractor ensuring that authenticators have sufficient strength of mechanism for their intended use through the required instructions as provided for CCI-000192, CCI-000193, CCI-000194, CCI-000195, CCI-000196, CCI-000197, CCI-000198, CCI-000199, CCI-000200, CCI-000205. Where these requirements conflict the contractor is instructed to apply the following order of precedence: 1) If present, Device Specific Requirements take precedence over any other requirements; and then 2) multifactor authentication requirements take precedence over password requirements.
CCI-001548	AC-4	The organization defines the information flow control policies for controlling the flow of information within the system.	Enclave Designer Non-Designer Impractical	Information Flow Enforcement	Impractical; the controller is part of a single vendor Life Safety system. Information flow is controlled and restricted to only that required by the system.
CCI-001549	AC-4	The organization defines the information flow control policies for controlling the flow of information between interconnected systems.	Enclave Designer Non-Designer Impractical	Information Flow Enforcement	Impractical; the controller is part of a single vendor Life Safety system. Information flow is controlled and restricted to only that required by the system.
CCI-001550	AC-4	The organization defines approved authorizations for controlling the flow of information within the system.	Enclave Designer Non-Designer Impractical	Information Flow Enforcement	Impractical; the controller is part of a single vendor Life Safety system. Information flow is controlled and restricted to only that required by the system.
CCI-001551	AC-4	The organization defines approved authorizations for controlling the flow of information between interconnected systems.	Enclave Designer Non-Designer Impractical	Information Flow Enforcement	Impractical; the controller is part of a single vendor Life Safety system. Information flow is controlled and restricted to only that required by the system.
CCI-001558	AC-6(1)	The organization defines the security functions (deployed in hardware, software, and firmware) for which access must be explicitly authorized.	DoD-Defined Designer Impractical	User Accounts; USER IDENTIFICATION AND AUTHENTICATION	The organization defines the security functions (deployed in hardware, software, and firmware) for which access must be explicitly authorized.
CCI-001571	AU-2(a)	The organization defines the information system auditable events.	DoD-Defined Designer Impractical	Audit Events, Content of Audit Records, and Audit Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-001577	AU-12(1)	The organization defines the information system components from which audit records are to be compiled into the system-wide audit trail.	Designer Non-Designer	Audit Reduction and Report Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-001588	CM-6(a)	The organization-defined security configuration checklists reflect the most restrictive mode consistent with operational requirements.	DoD-Defined Designer Non-Designer Impractical	IP Control Networks;	The organization is responsible for ensuring that the organization-defined security configuration checklists reflect the most restrictive mode consistent with operational requirements.
CCI-001592	CM-7(2)	The organization defines the rules authorizing the terms and conditions of software program usage on the information system.	Designer	---	The organization is responsible for defining the rules authorizing the terms and conditions of software program usage on the control system.
CCI-001610	IA-5(g)	The organization defines the time period (by authenticator type) for changing/refreshing authenticators.	DoD-Defined Designer Non-Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	The organization is responsible for defining the time period (by authenticator type) for changing/refreshing authenticators. DoD has defined the time period as CAC - every 3 years, or 1 year from term of contract Password: 60 days Biometrics: every 3 years.
CCI-001611	IA-5(1)(a)	The organization defines the minimum number of special characters for password complexity enforcement.	DoD-Defined Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	The organization is responsible for defining the minimum number of special characters for password complexity enforcement. DoD has defined the minimum number of special characters for password complexity enforcement as one special character.
CCI-001612	IA-5(1)(a)	The organization defines the minimum number of upper case characters for password complexity enforcement.	DoD-Defined Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	The organization is responsible for defining the minimum number of upper case characters for password complexity enforcement. DoD has defined the minimum number of upper case characters for password complexity enforcement as one upper-case character.
CCI-001613	IA-5(1)(a)	The organization defines the minimum number of lower case characters for password complexity enforcement.	DoD-Defined Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	The organization is responsible for defining the minimum number of lower case characters for password complexity enforcement. DoD has defined the minimum number of lower case characters for password complexity enforcement as one lower-case character.
CCI-001614	IA-5(1)(a)	The organization defines the minimum number of numeric characters for password complexity enforcement.	DoD-Defined Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	The organization is responsible for defining the minimum number of numeric characters for password complexity enforcement. DoD has defined the minimum number of numeric characters for password complexity enforcement as one numeric character.
CCI-001615	IA-5(1)(b)	The organization defines the minimum number of characters that are changed when new passwords are created.	DoD-Defined Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	The organization is responsible for defining the minimum number of characters that are changed when new passwords are created. DoD has defined the minimum number of characters as 50% of the minimum password length.
CCI-001616	IA-5(1)(d)	The organization defines minimum password lifetime restrictions.	DoD-Defined Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	The organization is responsible for defining minimum password lifetime restrictions. DoD has defined the minimum password lifetime restrictions as 24 hours.
CCI-001617	IA-5(1)(d)	The organization defines maximum password lifetime restrictions.	DoD-Defined Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	The organization is responsible for defining maximum password lifetime restrictions. DoD has defined the maximum password lifetime restrictions as 60 days.
CCI-001618	IA-5(1)(e)	The organization defines the number of generations for which password reuse is prohibited.	DoD-Defined Enclave Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	This is met by requiring the contractor to configure all controllers FULLY supporting accounts and supporting password-based authentication, and Passwords for Remote Interfaces to ensure that all password must differ from previous five (5) passwords, where differ is defined as changing at least fifty percent of the characters. Contractor is required to determine and apply all applicable STIGs/SRGs.
CCI-001619	IA-5(1)(a)	The information system enforces password complexity by the minimum number of special characters used.	Enclave Designer	USER IDENTIFICATION AND AUTHENTICATION	The contractor is responsible for configuring the control system device(s) to enforce password complexity by the minimum number of special characters used. DoD has defined the minimum number of special characters for password complexity used.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-001641	RA-5(a)	The organization defines the process for conducting random vulnerability scans on the information system and hosted applications.	Enclave Designer Non-Designer Impractical	VULNERABILITY SCANNING	Impractical; The controller does not support this level of functionality. The controller is not connected to an IP network.
CCI-001643	RA-5(a)	The organization scans for vulnerabilities in the information system and hosted applications in accordance with the organization-defined process for random scans.	Enclave Designer Non-Designer	VULNERABILITY SCANNING	Impractical; The controller does not support this level of functionality. The controller is not connected to an IP network.
CCI-001645	RA-5(5)	The organization identifies the information system components to which privileged access is authorized for selected organization-defined vulnerability scanning activities.	DoD-Defined Enclave Designer Impractical	DATABASE AND WEB SERVER SOFTWARE; VULNERABILITY SCANNING	Impractical; The controller does not support this level of functionality. The controller is not connected to an IP network.
CCI-001662	SC-18(1)	The information system takes organization-defined corrective action when organization-defined unacceptable mobile code is identified.	Enclave Designer Non-Designer	Mobile Code	Impractical; the Fire and Life Safety device(s) do not support mobile code.
CCI-001664	SC-23(3)	The information system recognizes only session identifiers that are system-generated.	Designer	Device Identification and Authentic...	Impractical; the controller does not implement IP session identifiers. The controller is limited to its core functionality and proprietary systems only.
CCI-001665	SC-24	The information system preserves organization-defined system state information in the event of a system failure.	Designer Impractical	---	Impractical; the system does not support organizational level criteria. The controller is a single function devices that provides proprietary information.
CCI-001682	AC-2(2)	The information system automatically removes or disables emergency accounts after an organization-defined time period for each type of account.	DoD-Defined Enclave Designer Non-Designer Impractical	---	Impractical; the controller does not support emergency accounts.
CCI-001683	AC-2(4)	The information system notifies organization-defined personnel or roles for account creation actions.	Enclave Designer	User Accounts	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-001684	AC-2(4)	The information system notifies organization-defined personnel or roles for account modification actions.	Enclave Designer	User Accounts	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-001685	AC-2(4)	The information system notifies organization-defined personnel or roles for account disabling actions.	Enclave Designer	User Accounts	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-001686	AC-2(4)	The information system notifies organization-defined personnel or roles for account removal actions.	Enclave Designer	User Accounts	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-001695	SC-18(3)	The information system prevents the execution of organization-defined unacceptable mobile code.	Designer Non-Designer	Mobile Code	Impractical; the Fire and Life Safety device(s) do not support mobile code.
CCI-001737	CM-2(7)a	The organization defines the information systems, system components, or devices that are to have organization-defined configurations applied when located in areas of significant risk.	Designer Non-Designer	---	This is partially met by implementation of the Cybersecurity Design Process as required by UFC 4-010-06 with the provision of the appropriate 25 05 11.XX UFGS Specification for the identified Control System(s). Then, the Contractor is required to provide baseline Control System Cybersecurity Documentation at project end for all Control System, subsystems, and devices as a final submittal requirement. The organization is responsible to ensure these baseline configurations defined in CM-2 (7), CCI-001738 applied when located in areas of significant risk as part of the Control System Device Configuration Management Policy upon final acceptance of the system.
CCI-001738	CM-2(7)a	The organization defines the security configurations to be implemented on information systems, system components, or devices when they are located in areas of significant risk.	Designer Non-Designer	---	This is partially met by implementation of the Cybersecurity Design Process as required by UFC 4-010-06 with the provision of the appropriate 25 05 11 UFGS Specification for the identified Control System(s). Then, the Contractor is required to provide baseline Control System Cybersecurity Documentation at project end for all Control System, subsystems, and devices as a final submittal requirement. The organization is responsible to ensure these baseline configurations defined in CM-2 (7), CCI-001738 applied when located in areas of significant risk as part of the Control System Device Configuration Management Policy upon final acceptance of the system.
CCI-001755	CM-6(c)	The organization defines the information system components for which any deviation from the established configuration settings are to be identified, documented and approved.	DoD-Defined Designer Non-Designer Impractical	IP Control Networks;	The organization is responsible for defining the control system components for which any deviation from the established configuration settings are to be identified, documented and approved.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-001761	CM-7(1)(b)	The organization defines the functions, ports, protocols and services within the information system that are to be disabled when deemed unnecessary and/or nonsecure.	Designer	Information Flow Enforcement; IP Control Networks;	Impractical; controllers do not have IP functionality.
CCI-001762	CM-7(1)(b)	The organization disables organization-defined functions, ports, protocols, and services within the information system deemed to be unnecessary and/or nonsecure.	Designer Impractical	Information Flow Enforcement; IP Control Networks;	Impractical; controllers do not have IP functionality.
CCI-001763	CM-7(2)	The organization defines the policies regarding software program usage and restrictions.	Designer Non-Designer	---	The organization is responsible for defining the policies regarding software program usage and restrictions.
CCI-001764	CM-7(2)	The information system prevents program execution in accordance with organization-defined policies regarding software program usage and restrictions, and/or rules authorizing the terms and conditions of software program usage.	Designer	---	Impractical; The systems in question are either package systems or components. These are provided by the manufacturer to function as designed. The contractor is unable to expand or modify the componets beyond that which the manufacturer has provided.
CCI-001772	CM-7(5)a	The organization defines the software programs authorized to execute on the information system.	Designer	---	This is met requiring the contractor to complete a Control System Inventory report using the most current Inventory Spreadsheet listed at the www.wbdg.org documenting all devices, including networked devices, network infrastructure devices, non-networked devices, input devices (e.g. sensors) and output devices (e.g. actuators) that includes all components withing the authorization boundary of the system. Contractor is required that for each device, they must provide all applicable information for which there is a field on the spreadsheet in accordance with the instructions on the spreadsheet.
CCI-001773	CM-7(5)a	The organization identifies the organization-defined software programs authorized to execute on the information system.	Designer	---	The organization is responsible for identifying the organization-defined software programs authorized to execute on the control system.
CCI-001774	CM-7(5)b	The organization employs an deny-all, permit-by-exception policy to allow the execution of authorized software programs on the information system.	Designer	---	The organization is responsible for employing a deny-all, permit-by-exception policy to allow the execution of authorized software programs on the control system.
CCI-001812	CM-11(2)	The information system prohibits user installation of software without explicit privileged status.	Designer Non-Designer	User Accounts	The contractor must configure the information system to prevent the installation of software by non-privileged users. The organization must define the specific limitations for each user account type. Any user interface supporting user accounts (either FULLY or MINIMALLY) must limit access according to specified limitations for each account. Install and configure any device having a STIG or SRG per that STIG or SRG.
CCI-001813	CM-5(1)	The information system enforces access restrictions.	Designer Non-Designer	User Accounts	The contractor must configure the information system to prevent the installation of software by non-privileged users. The organization must define the specific limitations for each user account type. Any user interface supporting user accounts (either FULLY or MINIMALLY) must limit access according to specified limitations for each account. Install and configure any device having a STIG or SRG per that STIG or SRG.
CCI-001814	CM-5(1)	The Information system supports auditing of the enforcement actions.	Designer Non-Designer	Audit Events, Content of Audit Records, and Audit Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-001875	AU-7(a)	The information system provides an audit reduction capability that supports on-demand audit review and analysis.	Enclave Designer Impractical	Audit Reduction and Report Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-001876	AU-7(a)	The information system provides an audit reduction capability that supports on-demand reporting requirements.	Enclave Designer Impractical	Audit Reduction and Report Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-001877	AU-7(a)	The information system provides an audit reduction capability that supports after-the-fact investigations of security incidents.	Enclave Designer Impractical	Audit Reduction and Report Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-001878	AU-7(a)	The information system provides a report generation capability that supports on-demand audit review and analysis.	Enclave Designer Impractical	Audit Reduction and Report Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-001879	AU-7(a)	The information system provides a report generation capability that supports on-demand reporting requirements.	Enclave Designer Impractical	Audit Reduction and Report Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-001880	AU-7(a)	The information system provides a report generation capability that supports after-the-fact investigations of security incidents.	Enclave Designer Impractical	Audit Reduction and Report Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-001881	AU-7(b)	The information system provides an audit reduction capability that does not alter original content or time ordering of audit records.	Enclave Designer Impractical	Audit Reduction and Report Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-001882	AU-7(b)	The information system provides a report generation capability that does not alter original content or time ordering of audit records.	Enclave Designer Impractical	Audit Reduction and Report Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-001889	AU-8(b)	The information system records time stamps for audit records that meets organization-defined granularity of time measurement.	Designer	Audit Time Stamps	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-001890	AU-8(b)	The information system records time stamps for audit records that can be mapped to Coordinated Universal Time (UTC) or Greenwich Mean Time (GMT).	Designer	Audit Time Stamps	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-001891	AU-8(1)	The information system compares internal information system clocks on an organization-defined frequency with an organization-defined authoritative time source.	Designer	Audit Time Stamps	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-001892	AU-8(1)	The organization defines the time difference which, when exceeded, will require the information system to synchronize the internal information system clocks to the organization-defined authoritative time source.	Designer Non-Designer	Audit Time Stamps	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-001899	AU-10	The organization defines the action to be covered by non-repudiation.	DoD-Defined Designer Non-Designer	Audit Events, Content of Audit Records, and Audit Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-001910	AU-12(b)	The organization defines the personnel or roles allowed select which auditable events are to be audited by specific components of the information system.	DoD-Defined Designer Impractical	Audit Events, Content of Audit Records, and Audit Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-001914	AU-12(3)	The information system provides the capability for organization-defined individuals or roles to change the auditing to be performed on organization-defined information system components based on organization-defined selectable event criteria within organization-defined time thresholds.	Designer	Audit Events, Content of Audit Records, and Audit Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-001919	AU-14(b)	The information system provides the capability for authorized users to select a user session to capture/record or view/hear.	Designer Non-Designer	Audit Events, Content of Audit Records, and Audit Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-001942	IA-2(9)	The information system implements replay-resistant authentication mechanisms for network access to non-privileged accounts.	Designer Impractical	Cryptographic Protection	Impractical; this level of functionality is not provided in the controller or devices.
CCI-001953	IA-2(12)	The information system accepts Personal Identity Verification (PIV) credentials.	Enclave Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	Impractical; the system and controller are not network connected and do not support the ability to authenticate a PIV/CAC.
CCI-001954	IA-2(12)	The information system electronically verifies Personal Identity Verification (PIV) credentials.	Enclave Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	Impractical; the system and controller are not network connected and do not support the ability to authenticate a PIV/CAC.
CCI-001958	IA-3	The information system authenticates an organization defined list of specific and/or types of devices before establishing a local, remote, or network connection.	Enclave Designer Impractical	Control System Inventory Report; Device Identification and Authentication	Impractical; the system does not support mobile devices.
CCI-001959	IA-3(1)	The organization defines the specific devices and/or type of devices the information system is to authenticate before establishing a connection.	DoD-Defined Designer Impractical	Cryptographic Protection	Impractical; the control system does not support IP networked devices. Networked densing and notification devices operate on a proprietary network and do not support this control.
CCI-001967	IA-3(1)	The information system authenticates organization-defined devices and/or types of devices before establishing a local, remote and/or network connection using bidirectional authentication that is cryptographically based.	Designer Impractical	Cryptographic Protection	Impractical; the control system does not support IP networked devices. Networked densing and notification devices operate on a proprietary network and do not support this control.
CCI-001989	IA-5(e)	The organization manages information system authenticators by changing default content of authenticators prior to information system installation.	Designer	USER IDENTIFICATION AND AUTHENTICATION	For all devices with a password, change the password from the default password. Coordinate selection of passwords with the Government. Do not use the same password for more than one device unless specifically instructed to do so. Provide a Confidential Password Report documenting the password for each device and describing the procedure to change the password for each device.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-001991	IA-5(2)(d)	The information system, for PKI-based authentication, implements a local cache of revocation data to support path discovery and validation in case of inability to access revocation information via the network.	Enclave Designer	---	Impractical; PKI or Certificates are not supported in Fire and Life Safety controllers and equipment.
CCI-001996	IA-5(4)	The organization defines the requirements required by the automated tools to determine if password authenticators are sufficiently strong.	DoD-Defined Designer Non-Designer	---	The organization is responsible to ensure the requirements required by the automated tools to determine if password authenticators are sufficiently strong in their complexity as identified in IA-5 (1) Part A, as defined by the DoD.
CCI-001997	IA-5(4)	The organization employs automated tools to determine if password authenticators are sufficiently strong to satisfy organization-defined requirements.	Designer Non-Designer Impractical	---	The organization is responsible to employ automated tools to determine if password authenticators are sufficiently strong to satisfy organization-defined requirements.
CCI-002002	IA-5(11)	The organization defines the token quality requirements to be employed by the information system mechanisms for token-based authentication.	DoD-Defined Enclave Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	Impractical; this control is not supported on controllers that are not FULLY implementing passwords via the network. The controller is not connected to a network that allows for PKI credentials.
CCI-002003	IA-5(11)	The information system, for token-based authentication, employs mechanisms that satisfy organization-defined token quality requirements.	Enclave Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	Impractical; this control is not supported on controllers that are not FULLY implementing passwords via the network. The controller is not connected to a network that allows for PKI credentials.
CCI-002007	IA-5(13)	The information system prohibits the use of cached authenticators after an organization defined time period.	Designer Non-Designer	USER IDENTIFICATION AND AUTHENTICATION	Unless otherwise indicated, all user interfaces supporting accounts (either FULLY or MINIMALLY) must implement Identification and Authorization via passwords. For all non-computing components, (e.g., PLC's, RTU's, and Human Machine Interface (HMI)'s) that cannot meet the password requirements, use the strongest password that is technically feasible as long as this does not interfere with the full functionality of the control system component and the control system it supports, as designed. All devices and software must not use cached authenticators. The organization is responsible for ensuring all policies and user training, including advising users not to use the same password for domains of differing classification levels. more than one domain of a classification level (e.g., internal agency network and Intelink), and more than one privilege level (e.g., user, administrator) upon final acceptance of the system.
CCI-002041	IA-5(1)(f)	The information system allows the use of a temporary password for system logons with an immediate change to a permanent password.	Enclave Designer Impractical	USER IDENTIFICATION AND AUTHENTICATION	Impractical; controllers do not support termporary password functionality.
CCI-002046	AU-8(1)	The information system synchronizes the internal system clocks to the authoritative time source when the time difference is greater than the organization-defined time period.	Designer	Audit Time Stamps	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-002047	AU-12(3)	The organization defines the information system components on which the auditing that is to be performed can be changed by organization-defined individuals or roles.	Designer Non-Designer	CYBERSECURITY AUDITING; Audit Events, Content of Audit Records, and Audit Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-002054	AT-3(4)	The organization defines indicators of malicious code to recognize suspicious communications and anomalous behavior in organizational information systems.	Designer Non-Designer	---	The organization is responsible for defining indicators of malicious code to recognize suspicious communications and anomalous behavior in organizational control systems.
CCI-002059	CM-6(1)	The organization defines the information system components for which the organization will employ automated mechanisms to centrally manage, apply, and verify configuration settings.	Designer Non-Designer	---	The organization is responsible for defining the control system components for which the organization will employ automated mechanisms to centrally manage, apply, and verify configuration settings.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-002102	CA-9(a)	The organization defines the information system components or classes of components that that are authorized internal connections to the information system.	Designer	Network Communication Report	This is met by requiring the contractor to provide a network communication report. For each networked device, contractor is required to document the communication characteristics of the device including communication protocols, services used, encryption employed, and a general description of what information is communicated over the network. For non-IP communications, contractor is required to document communication protocol and media used. The organization is responsible to define and document any other system components or classes of components that that are authorized internal connections to the system upon final acceptance of the system as DoD has determined the information system components are not appropriate to define at the Enterprise level.
CCI-002103	CA-9(b)	The organization documents, for each internal connection, the interface characteristics.	Designer	Network Communication Report	This is met by requiring the contractor to provide a network communication report. For each networked device, contractor is required to document the communication characteristics of the device including communication protocols, services used, encryption employed, and a general description of what information is communicated over the network. For non-IP communications, contractor is required to document communication protocol and media used.
CCI-002104	CA-9(b)	The organization documents, for each internal connection, the security requirements.	Designer	Network Communication Report	This is met by requiring the contractor to provide a network communication report. For each networked device, contractor is required to document the communication characteristics of the device including communication protocols, services used, encryption employed, and a general description of what information is communicated over the network. For non-IP communications, contractor is required to document communication protocol and media used. Contractor is required to provide a copy of a riser diagram in one-line format overlayed on a facility schematic as part of the final CYBERSECURITY DOCUMENTATION.
CCI-002105	CA-9(b)	The organization documents, for each internal connection, the nature of the information communicated.	Designer	Network Communication Report	This is met by requiring the contractor to provide a network communication report. For each networked device, contractor is required to document the communication characteristics of the device including communication protocols, services used, encryption employed, and a general description of what information is communicated over the network. For non-IP communications, contractor is required to document communication protocol and media used. Contractor is required to provide a copy of a riser diagram in one-line format overlayed on a facility schematic as part of the final CYBERSECURITY DOCUMENTATION.
CCI-002110	AC-2(a)	The organization defines the information system account types that support the organizational missions/business functions.	Designer	User Accounts	This is met by requiring the contractor to ensure that any user interface supporting user accounts (either FULLY or MINIMALLY) must limit access according to specified limitations for each account. Contractor is required to install and configure any device having a STIG or SRG in accordance with that STIG or SRG. Contractor is required to ensure that all user interfaces FULLY supporting accounts must implement user-based authentication where each account is uniquely assigned to a specific user. Contractor is required to ensure User interfaces FULLY supporting accounts must implement at least three (3) levels of user account privilege including: 1) an account with read-only permissions 2) an account with full permissions including account creation and modification and 3) an account with greater permissions than read-only but without account creation and modification.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-002130	AC-2(4)	The information system automatically audits account enabling actions.	Enclave Designer Impractical	User Accounts; Audit Events, Content of Audit Records, and Audit Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-002132	AC-2(4)	The information system notifies organization-defined personnel or roles for account enabling actions.	Enclave Designer	User Accounts; Audit Events, Content of Audit Records, and Audit Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-002146	AC-2(12)(a)	The organization defines atypical usage for which the information system accounts are to be monitored.	Designer Non-Designer	---	Non-Designer; The organization is responsible to define and document atypical usage for which the system accounts are to be monitored as DoD has determined atypical usage is not appropriate to define at the Enterprise level.
CCI-002221	AC-6(1)	The organization defines the security-relevant information for which access must be explicitly authorized.	DoD-Defined Designer Impractical	User Accounts; USER IDENTIFICATION AND AUTHENTICATION	The organization is responsible for defining the security-relevant information for which access must be explicitly authorized.
CCI-002222	AC-6(1)	The organization explicitly authorizes access to organization-defined security functions.	DoD-Defined Designer Impractical	User Accounts; USER IDENTIFICATION AND AUTHENTICATION	The organization is responsible for explicitly authorizing access to organization-defined security functions.
CCI-002223	AC-6(1)	The organization explicitly authorizes access to organization-defined security-relevant information.	DoD-Defined Designer Impractical	User Accounts; USER IDENTIFICATION AND AUTHENTICATION	The organization is responsible for explicitly authorizing access to organization-defined security-relevant information.
CCI-002234	AC-6(9)	The information system audits the execution of privileged functions.	Designer Impractical	User Accounts; USER IDENTIFICATION AND AUTHENTICATION	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-002235	AC-6(10)	The information system prevents non-privileged users from executing privileged functions to include disabling, circumventing, or altering implemented security safeguards/countermeasures.	Designer Impractical	User Accounts; USER IDENTIFICATION AND AUTHENTICATION	The contractor ensures that the security system is implemented such that administrative or engineering functions addressing security are protected from non-privileged users. This level of implementation is dictated based on the limitations of the system.
CCI-002236	AC-7(b)	The organization defines the time period the information system will automatically lock the account or node when the maximum number of unsuccessful attempts is	DoD-Defined Designer Impractical	Unsuccessful Logon Attempts	Impractical; the control system is used for life safety. As such, it can not be locked out for any extended periods of time.
CCI-002237	AC-7(b)	The organization defines the delay algorithm to be employed by the information system to delay the next login prompt when the maximum number of unsuccessful attempts is exceeded.	DoD-Defined Designer Impractical	Unsuccessful Logon Attempts	Impractical; the control system is used for life safety. As such, it can not be locked out for any extended periods of time.
CCI-002238	AC-7(b)	The information system automatically locks the account or node for either an organization-defined time period, until the locked account or node is released by an administrator, or delays the next login prompt according to the organization-defined delay algorithm when the maximum number of unsuccessful attempts is exceeded.	Designer Impractical	Unsuccessful Logon Attempts	Impractical; the control system is used for life safety. As such, it can not be locked out for any extended periods of time.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-002243	AC-8(a)(1)	The organization-defined information system use notification message or banner is to state that users are accessing a U.S. Government information system.	DoD-Defined Enclave Designer Impractical	System Use Notification	For networked devices with Remote User Interfaces which are capable, Contractor is required to configure the device to display a warning banner meeting the requirements of DTM 08-060 on screen. For Devices which are connected to a network and have a local user interface Contractor must ensure these display a warning banner meeting the requirements of DTM 08-060 on the user interface screen if capable of doing so and must have a permanently affixed label with an approved banner from DTM 08-060 if unable to display the warning banner on the screen. Where it is impractical (perhaps due to device size) to affix the label to the device, affix the label to the device enclosure.Labels must be machine printed or engraved, plastic or metal, designed for permanent installation, must use a font no smaller than 14 point, and must provide a high contrast between font and background colors All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06).
CCI-002244	AC-8(a)(2)	The organization-defined information system use notification message or banner is to state that information system usage may be monitored, recorded, and subject to audit.	DoD-Defined Enclave Designer Impractical	System Use Notification	For networked devices with Remote User Interfaces which are capable, Contractor is required to configure the device to display a warning banner meeting the requirements of DTM 08-060 on screen. For Devices which are connected to a network and have a local user interface Contractor must ensure these display a warning banner meeting the requirements of DTM 08-060 on the user interface screen if capable of doing so and must have a permanently affixed label with an approved banner from DTM 08-060 if unable to display the warning banner on the screen. Where it is impractical (perhaps due to device size) to affix the label to the device, affix the label to the device enclosure.Labels must be machine printed or engraved, plastic or metal, designed for permanent installation, must use a font no smaller than 14 point, and must provide a high contrast between font and background colors All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06).
CCI-002245	AC-8(a)(3)	The organization-defined information system use notification message or banner is to state that unauthorized use of the information system is prohibited and subject to criminal and civil penalties.	DoD-Defined Enclave Designer Impractical	System Use Notification	For networked devices with Remote User Interfaces which are capable, Contractor is required to configure the device to display a warning banner meeting the requirements of DTM 08-060 on screen. For Devices which are connected to a network and have a local user interface Contractor must ensure these display a warning banner meeting the requirements of DTM 08-060 on the user interface screen if capable of doing so and must have a permanently affixed label with an approved banner from DTM 08-060 if unable to display the warning banner on the screen. Where it is impractical (perhaps due to device size) to affix the label to the device, affix the label to the device enclosure.Labels must be machine printed or engraved, plastic or metal, designed for permanent installation, must use a font no smaller than 14 point, and must provide a high contrast between font and background colors All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06).

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-002246	AC-8(a)(4)	The organization-defined information system use notification message or banner is to state that use of the information system indicates consent to monitoring and recording.	DoD-Defined Enclave Designer Impractical	System Use Notification	For networked devices with Remote User Interfaces which are capable, Contractor is required to configure the device to display a warning banner meeting the requirements of DTM 08-060 on screen. For Devices which are connected to a network and have a local user interface Contractor must ensure these display a warning banner meeting the requirements of DTM 08-060 on the user interface screen if capable of doing so and must have a permanently affixed label with an approved banner from DTM 08-060 if unable to display the warning banner on the screen. Where it is impractical (perhaps due to device size) to affix the label to the device, affix the label to the device enclosure.Labels must be machine printed or engraved, plastic or metal, designed for permanent installation, must use a font no smaller than 14 point, and must provide a high contrast between font and background colors All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06).
CCI-002247	AC-8(a)	The organization defines the use notification message or banner the information system displays to users before granting access to the system.	DoD-Defined Enclave Designer Impractical	System Use Notification	For networked devices with Remote User Interfaces which are capable, Contractor is required to configure the device to display a warning banner meeting the requirements of DTM 08-060 on screen. For Devices which are connected to a network and have a local user interface Contractor must ensure these display a warning banner meeting the requirements of DTM 08-060 on the user interface screen if capable of doing so and must have a permanently affixed label with an approved banner from DTM 08-060 if unable to display the warning banner on the screen. Where it is impractical (perhaps due to device size) to affix the label to the device, affix the label to the device enclosure.Labels must be machine printed or engraved, plastic or metal, designed for permanent installation, must use a font no smaller than 14 point, and must provide a high contrast between font and background colors All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06).
CCI-002248	AC-8(c)(1)	The organization defines the conditions of use which are to be displayed to users of the information system before granting further access.	DoD-Defined Enclave Designer Impractical	System Use Notification	For networked devices with Remote User Interfaces which are capable, Contractor is required to configure the device to display a warning banner meeting the requirements of DTM 08-060 on screen. For Devices which are connected to a network and have a local user interface Contractor must ensure these display a warning banner meeting the requirements of DTM 08-060 on the user interface screen if capable of doing so and must have a permanently affixed label with an approved banner from DTM 08-060 if unable to display the warning banner on the screen. Where it is impractical (perhaps due to device size) to affix the label to the device, affix the label to the device enclosure.Labels must be machine printed or engraved, plastic or metal, designed for permanent installation, must use a font no smaller than 14 point, and must provide a high contrast between font and background colors All other requirements for this CCI must be met at the ENCLAVE. Per UFC 4-010-06, Section 3-5.1 Identifiers by Responsibility: The CCI contains a requirement which is expected to be implemented at the Platform Enclave… Platform Enclave is not the designer's responsibility, (Source: UFC-4-010-06).
CCI-002252	AC-10	The organization defines the accounts for which the information system will limit the number of concurrent sessions.	DoD-Defined Designer Non-Designer	Session Lock and Session Termination	Non-Designer: The organization is responsible for addressing this control

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-002323	AC-18(a)	The organization establishes configuration/connection requirements for wireless access.	Designer Non-Designer	Wireless and Wired Broadcast Communication	The use of wireless and wired broadcast communication for fire protection systems within a facility is prohibited. Wireless communication may be used to provide communication from the fire protection system in a facility to the central monitoring station.
CCI-002338	AC-20(3)	The organization restricts or prohibits the use of non-organizationally owned information systems, system components, or devices to process, store, or transmit organizational information.	Designer Non-Designer	---	Non-Designer; The organization is responsible to restrict or prohibit the use of non-organizationally owned information systems, system components, or devices to process, store, or transmit organizational information.
CCI-002360	AC-12	The organization defines the conditions or trigger events requiring session disconnect to be employed by the information system when automatically terminating a user session.	Enclave Designer Impractical	Session Lock and Session Termination Requirements	Impractical; Session Locking and Termination is not appropriate for Life Safety systems.
CCI-002361	AC-12	The information system automatically terminates a user session after organization-defined conditions or trigger events requiring session disconnect.	Enclave Designer Impractical	Session Lock and Session Termination Requirements	Impractical; Session Locking and Termination is not appropriate for Life Safety systems.
CCI-002398	SC-7(9)(a)	The information system detects outgoing communications traffic posing a threat to external information systems.	Enclave Designer Non-Designer	Cybersecurity Interconnection Schedule Process Isolation and	Non-Designer; the organization must evaluate this requirement and address this control.
CCI-002399	SC-7(9)(a)	The information system denies outgoing communications traffic posing a threat to external information systems.	Enclave Designer Non-Designer	Cybersecurity Interconnection Schedule Process Isolation and	Non-Designer; This control is addresses by the Enclave
CCI-002400	SC-7(9)(b)	The information system audits the identity of internal users associated with denied outgoing communications traffic posing a threat to external information systems.	Designer Impractical	Audit Events, Content of Audit Records, and Audit Generation	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement auditing.
CCI-002401	SC-7(11)	The organization defines the authorized sources from which the information system will allow incoming communications.	Enclave Designer Non-Designer	Cybersecurity Interconnection Schedule	The organization is responsible for defining the authorized sources from which the control system will allow incoming communications.
CCI-002402	SC-7(11)	The organization defines the authorized destinations for routing inbound communications.	Enclave Designer Non-Designer	Cybersecurity Interconnection Schedule	The organization is responsible for defining the authorized destinations for routing inbound communications.
CCI-002403	SC-7(11)	The information system only allows incoming communications from organization-defined authorized sources routed to organization-defined authorized destinations.	Enclave Designer Non-Designer	Cybersecurity Interconnection Schedule	The contractor is responsible for configuring the control system device(s) to only allow incoming communications from organization-defined authorized sources routed to organization-defined authorized destinations.
CCI-002404	SC-7(12)	The organization defines the host-based boundary protection mechanisms that are to be implemented at organization-defined information system components.	Enclave Designer Non-Designer	---	Non-Designer; The organization is responsible for this control.
CCI-002405	SC-7(12)	The organization defines the information system components at which organization-defined host-based boundary protection mechanisms will be implemented.	Enclave Designer Non-Designer	---	Non-Designer; The organization is responsible for this control.
CCI-002406	SC-7(12)	The organization implements organization-defined host-based boundary protection mechanisms at organization-defined information system components.	Enclave Designer Non-Designer	---	Non-Designer; The organization is responsible for this control.
CCI-002418	SC-8	The information system protects the confidentiality and/or integrity of transmitted information.	Designer	Cryptographic Protection; Physical Security	Install all device media inside the mission space in intermediate metallic conduit and all device media outside the mission space in rigid metallic conduit.
CCI-002419	SC-8(1)	The organization defines the alternative physical safeguards to be employed when cryptographic mechanisms are not implemented to protect information during transmission.	DoD-Defined Designer	Physical Security	The organization is responsible for defining the alternative physical safeguards to be employed when cryptographic mechanisms are not implemented to protect information during transmission. The contractor adheres to these safeguards when configuring the control system and placing the components of the control system.
CCI-002420	SC-8(2)	The information system maintains the confidentiality and/or integrity of information during preparation for transmission.	Designer	---	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement cryptography to protect the confidentiality and/or integrity of information during preparation for transmission.
CCI-002421	SC-8(1)	The information system implements cryptographic mechanisms to prevent unauthorized disclosure of information and/or detect changes to information during transmission unless otherwise protected by organization-defined alternative physical safeguards.	Designer	Cryptographic Protection	The contractor will ensure that all system components are contained in lockable enclosures. Electronic cryptographic devices are not supported by the controller or system components.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-002422	SC-8(2)	The information system maintains the confidentiality and/or integrity of information during reception.	Designer	---	Impractical; there is no requirement for the Fire & Life Safety device(s) to implement cryptography to maintain the confidentiality and/or integrity of information during reception.
CCI-002449	SC-13	The organization defines the cryptographic uses, and type of cryptography required for each use, to be implemented by the information system.	DoD-Defined Enclave Designer Impractical	Cryptographic Protection	Impractical; the control system is proprietary and only supports the cryptographic methodology that is built into the system.
CCI-002450	SC-13	The information system implements organization-defined cryptographic uses and type of cryptography required for each use in accordance with applicable federal laws, Executive Orders, directives, policies, regulations, and standards.	Enclave Designer Impractical	Cryptographic Protection	Impractical; the control system is proprietary and only supports the cryptographic methodology that is built into the system.
CCI-002457	SC-18(1)	The organization defines the corrective actions to be taken when organization-defined unacceptable mobile code is identified.	Enclave Designer Non-Designer	Mobile Code	Impractical; the Fire and Life Safety device(s) do not support mobile code.
CCI-002458	SC-18(1)	The organization defines what constitutes unacceptable mobile code for its information systems.	Enclave Designer Non-Designer	Mobile Code	Impractical; the Fire and Life Safety device(s) do not support mobile code.
CCI-002460	SC-18(4)	The information system enforces organization-defined actions prior to executing the code.	Designer	---	Impractical; the Fire and Life Safety device(s) do not support mobile code.
CCI-002470	SC-23(5)	The information system only allows the use of organization-defined certificate authorities for verification of the establishment of protected sessions.	Designer	Device Identification and Authentic...	Impractical; the controller and system does not provide the ability to support PKI certificates or web based communications.
CCI-002472	SC-28	The organization defines the information at rest that is to be protected by the information system.	Designer Non-Designer Impractical	Protection of Information at Rest	This CCI is impractical because the control system is incapable of supporting it.
CCI-002475	SC-28(1)	The information system implements cryptographic mechanisms to prevent unauthorized modification of organization-defined information at rest on organization-defined information system components.	DoD-Defined Designer Impractical	Protection of Information at Rest	This CCI is impractical because the control system is incapable of supporting it.
CCI-002476	SC-28(1)	The information system implements cryptographic mechanisms to prevent unauthorized disclosure of organization-defined information at rest on organization-defined information system components.	DoD-Defined Designer Impractical	Protection of Information at Rest	This CCI is impractical because the control system is incapable of supporting it.
CCI-002530	SC-39	The information system maintains a separate execution domain for each executing process.	Designer	---	Not Applicable and/or Impractical; For computers this function is managed by the computer's operating system. This is a function of the operating system that cannot be configured or managed by an administrator or an integrator. It is managed by the Hardware Abstraction Layer (HAL). For OT Controllers/Devices, this is not supported.
CCI-002544	SC-41	The organization defines the information systems or information system components on which organization-defined connection ports or input/output devices are to be physically disabled or removed.	Enclave Designer Non-Designer	IP Control Networks	The organization is responsible for defining the control systems or control system components on which organization-defined connection ports or input/output devices are to be physically disabled or removed.
CCI-002545	SC-41	The organization defines the connection ports or input/output devices that are to be physically disabled or removed from organization-defined information systems or information system components.	Enclave Designer Non-Designer	IP Control Networks	The organization is responsible for defining the connection ports or input/output devices that are to be physically disabled or removed from organization-defined control systems or control system components.
CCI-002546	SC-41	The organization physically disables or removes organization-defined connection ports or input/output devices on organization-defined information systems or information system components.	Designer Impractical	IP Control Networks	The contractor is responsible for physically disabling or removing organization-defined input/output devices on organization-defined control systems or control system components.
CCI-002623	SI-3(c)(1)	The organization defines the frequency for performing periodic scans of the information system for malicious code.	DoD-Defined Designer Impractical	Malicious Code Protection	Impractical; In isolated systems without a computer there scanning from a central source is not possible. Additionally, disconnected systems do not have the ability to update definition files.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-002645	SI-4(b)	The organization defines the techniques and methods to be used to identify unauthorized use of the information system.	Enclave Designer Non-Designer	Information System Monitoring	This is partially met by requiring the contractor to provide all Control System Cybersecurity Documentation in accordance with all required Control System Cybersecurity Documentation submittals in accordance with SA-5 (a),(b),(c), CCI-003124, CCI-003125, CCI-003126, CCI-003127, CCI-003128, CCI-003129, CCI-003130, CCI-003131 as applicable which documents techniques and methods to be used to identify unauthorized use of the control system. For all other requirements, the organization is responsible to determine any additional techniques and methods (such as use of/connection to and enclave) as DoD has determined these are not appropriate to define at the Enterprise level.
CCI-002686	SI-4(23)	The organization defines the information system components at which organization-defined host-based monitoring mechanisms are to be implemented.	DoD-Defined Designer Non-Designer	---	Non-Designer; The organization is responsible to address this control.
CCI-002703	SI-7	The organization defines the software, firmware, and information which will be subjected to integrity verification tools to detect unauthorized changes.	Enclave Designer	---	Non-Designer; The organization is responsible to define the software, firmware, and information which will be subjected to integrity verification tools to detect unauthorized changes.
CCI-002705	SI-7(1)	The organization defines the software on which integrity checks will be performed.	Enclave Designer	---	Non-Designer; The organization is responsible to define the software on which integrity checks will be performed.
CCI-002706	SI-7(1)	The organization defines the firmware on which integrity checks will be performed.	Enclave Designer	---	Non-Designer; The organization is responsible to define the firmware on which integrity checks will be performed.
CCI-002707	SI-7(1)	The organization defines the information on which integrity checks will be performed.	Enclave Designer	---	Non-Designer; The organization is responsible to define the information on which integrity checks will be performed.
CCI-002710	SI-7(1)	The information system performs an integrity check of organization-defined software at startup, at organization-defined transitional states or security-relevant events, or on organization-defined frequency.	Enclave Designer	---	Enclave; This can only be performed at the Enclave level. Controllers and associated systems are not capable of performing self-checks.
CCI-002711	SI-7(1)	The information system performs an integrity check of organization-defined firmware at startup, at organization-defined transitional states or security-relevant events, or on organization-defined frequency.	Enclave Designer	---	Enclave; This can only be performed at the Enclave level. Controllers and associated systems are not capable of performing self-checks.
CCI-002712	SI-7(1)	The information system performs an integrity check of organization-defined information at startup, at organization-defined transitional states or security-relevant events, or on organization-defined frequency.	Enclave Designer	---	Enclave; This can only be performed at the Enclave level. Controllers and associated systems are not capable of performing self-checks.
CCI-002723	SI-7(8)	The information system, upon detection of a potential integrity violation, provides the capability to audit the event.	Designer Non-Designer Impractical	---	Non-Designer; The organization is responsible to address this control.
CCI-002724	SI-7(8)	The information system, upon detection of a potential integrity violation, initiates one or more of following actions: generates an audit record; alerts current user; alerts organization-defined personnel or roles; and/or organization-defined other actions.	Designer Non-Designer Impractical	---	Non-Designer; The organization is responsible to address this control.
CCI-002737	SI-7(14)(a)	The organization prohibits the use of binary or machine-executable code from sources with limited or no warranty and without the provision of source code.	Designer Non-Designer Impractical	SOFTWARE LICENSING	This is met by requiring the contractor to provide a single Software Licenses submittal with documentation of the software licenses for all software provided. The organization is responsible to prohibit the use of binary or machine-executable code obtained from sources without vendor support or with no warranty and without the provision of source code upon final acceptance of the system.
CCI-002744	SI-10	The organization defines the inputs the information system is to conduct validity checks.	DoD-Defined Designer	---	Non-Designer; The organization is responsible to address this control.
CCI-002754	SI-10(3)	The information system behaves in a predictable and documented manner that reflects organizational and system objectives when invalid inputs are received.	Designer Impractical	SAFE MODE AND FAIL SAFE OPERATION	This CCI is impractical because the control system is incapable of supporting it.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-002773	SI-17	The organization defines the fail-safe procedures to be implemented by the information system when organization-defined failure conditions occur.	Designer	Control System Inventory Report; SAFE MODE AND FAIL SAFE OPERATION	The organization is responsible for defining the fail-safe procedures to be implemented by the control system when organization-defined failure conditions occur.
CCI-002774	SI-17	The organization defines the failure conditions which, when they occur, will result in the information system implementing organization-defined fail-safe procedures.	Designer	Control System Inventory Report; SAFE MODE AND FAIL SAFE OPERATION	The organization is responsible for defining the failure conditions which, when they occur, will result in the control system implementing organization-defined fail-safe procedures.
CCI-002775	SI-17	The information system implements organization-defined fail-safe procedures when organization-defined failure conditions occur.	Designer	Control System Inventory Report; SAFE MODE AND FAIL SAFE OPERATION	The control system implements organization-defined fail-safe procedures when organization-defined failure conditions occur.
CCI-002855	CP-12	The information system, when organization-defined conditions are detected, enters a safe mode of operation with organization-defined restrictions of safe mode of operation.	Designer	SAFE MODE AND FAIL SAFE OPERATION	The control system, when organization-defined conditions are detected, enters a safe mode of operation with organization-defined restrictions of safe mode of operation. For all control system components with an applicable STIG or SRG, configure the component in accordance with all applicable STIGs and SRGs.
CCI-002856	CP-12	The organization defines the conditions, that when detected, the information system enters a safe mode of operation with organization-defined restrictions of safe mode of operation.	Designer	SAFE MODE AND FAIL SAFE OPERATION	The contractor is required to configure the control system so that when organization-defined conditions are detected, enters a safe mode of operation with organization-defined restrictions of safe mode of operation. For all control system components with an applicable STIG or SRG, configure the component in accordance with all applicable STIGs and SRGs.
CCI-002857	CP-12	The organization defines the restrictions of safe mode of operation that the information system will enter when organization-defined conditions are detected.	Designer	SAFE MODE AND FAIL SAFE OPERATION	The contractor is required to configure the control system so that when the organization defines the restrictions of safe mode of operation the information system will enter when organization-defined conditions are detected. For all control system components with an applicable STIG or SRG, configure the component in accordance with all applicable STIGs and SRGs.
CCI-002906	RA-5(5)	The organization defines the vulnerability scanning activities in which the information system implements privileged access authorization to organization-identified information system components.	Enclave Designer	DATABASE AND WEB SERVER SOFTWARE; VULNERABILITY SCANNING	Impractical; The controller does not support this level of functionality. The controller is not connected to an IP network.
CCI-002926	PE-3(1)	The organization defines the physical spaces containing one or more components of the information system that require physical access authorizations and controls at the facility.	Designer Non-Designer	Physical Security	The organization is responsible for defining the physical spaces containing one or more components of the control system that require physical access authorizations and controls at the facility.
CCI-002930	PE-4	The organization defines information system distribution and transmission lines within organizational facilities to control physical access using organization-defined security safeguards.	Designer Non-Designer	Physical Security	Install all device media inside the mission space in intermediate metallic conduit and all device media outside the mission space in rigid metallic conduit.
CCI-002931	PE-4	The organization defines security safeguards to control physical access to organization-defined information system distribution and transmission lines within organizational facilities.	Designer Non-Designer	Physical Security	Install all device media inside the mission space in intermediate metallic conduit and all device media outside the mission space in rigid metallic conduit.
CCI-003051	PL-2(a)(2)	The organization's security plan for the information system explicitly defines the authorization boundary for the system.	Enclave Designer Non-Designer	Cybersecurity Riser Diagram	Contractor is required to provide a copy of a riser diagram in one-line format overlayed on a facility schematic as part of the final CYBERSECURITY DOCUMENTATION which defines the authorization boundary for the system. The organization is responsible to use this diagram as the supporting rationale to define within the security plan the security categorization of the system upon final acceptance of the control system.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-003053	PL-2(a)(4)	The organization's security plan for the information system provides the security categorization of the information system including supporting rationale.	Designer Non-Designer	Cybersecurity Riser Diagram	Contractor is required to provide a copy of a riser diagram in one-line format overlayed on a facility schematic as part of the final CYBERSECURITY DOCUMENTATION which defines the authorization boundary for the system. The organization is responsible to use this diagram as the supporting rationale to define within the security plan the security categorization of the system upon final acceptance of the control system.
CCI-003072	PL-8(a)	The organization develops an information security architecture for the information system.	Designer Non-Designer	Cybersecurity Interconnection Schedule; Network Communication Report; Cybersecurity Riser Diagram	Contractor is required to provide a copy of a riser diagram in one-line format overlayed on a facility schematic as part of the final CYBERSECURITY DOCUMENTATION which shows the security architecture for the system. Contractor is to provide a network communication report for each networked device documenting the communication characteristics of the device (e.g., communication protocols, services used, any encryption employed, and a general description of what information is communicated over the network). For non-IP communications, contractor to document communication protocol and media used. Contractor is to document any requirements or submittals related to network communication, such as Points Schedules (CCI-002105). The organization is responsible for using this diagram to document a security architecture for the system upon final acceptance.
CCI-003073	PL-8(a)(1)	The organization's information security architecture for the information system describes the overall philosophy, requirements, and approach to be taken with regard to protecting the confidentiality, integrity, and availability of organizational information.	Designer Non-Designer	Cybersecurity Interconnection Schedule; Network Communication Report; Cybersecurity Riser Diagram	Contractor is required to provide a copy of a riser diagram in one-line format overlayed on a facility schematic as part of the final CYBERSECURITY DOCUMENTATION which shows the security architecture for the system. Contractor is to provide a network communication report for each networked device documenting the communication characteristics of the device (e.g., communication protocols, services used, any encryption employed, and a general description of what information is communicated over the network). For non-IP communications, contractor to document communication protocol and media used. Contractor is to document any requirements or submittals related to network communication, such as Points Schedules (CCI-002105). The organization is responsible for using this diagram to document a security architecture for the system upon final acceptance.
CCI-003075	PL-8(a)(3)	The organization's information security architecture for the information system describes any information security assumptions about, and dependencies on, external services.	Designer Non-Designer	Cybersecurity Interconnection Schedules; Network Communication Report; Cybersecurity Riser Diagram	Contractor is required to provide a copy of a riser diagram in one-line format overlayed on a facility schematic as part of the final CYBERSECURITY DOCUMENTATION which shows the security architecture for the system. Contractor is to provide a network communication report for each networked device documenting the communication characteristics of the device (e.g., communication protocols, services used, any encryption employed, and a general description of what information is communicated over the network). For non-IP communications, contractor to document communication protocol and media used. Contractor is to document any requirements or submittals related to network communication, such as Points Schedules (CCI-002105). The organization is responsible for using this diagram to document a security architecture for the system upon final acceptance.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-003081	PL-8(1)(a)	The organization designs its security architecture using a defense-in-depth approach that allocates organization-defined security safeguards to organization-defined locations.	Designer Non-Designer	---	Defining and documenting its security architecture using a defense-in-depth approach that allocates security safeguards defined in PL-8 (1), CCI-003083 to locations defined in PL-8 (1), CCI 3085 for the control system device is met by implementation of the Cybersecurity Design Process as required by UFC 4-010-06 with the provision of the appropriate 25 05 11.XX UFGS Specification for the identified Control System(s). Then, the Contractor is required to provide baseline Control System Cybersecurity Documentation at project end for all Control System, subsystems, and devices as a submittal requirement as part of the full and final Control System Cybersecurity Documentation. Upon final acceptance of the system the organization is responsible to continue to ensure that its security architecture uses a defense-in-depth approach that allocates security safeguards defined in PL-8 (1), CCI-003083 to locations defined in PL-8 (1), CCI-003085 for the control system device.
CCI-003082	PL-8(1)(a)	The organization designs its security architecture using a defense-in-depth approach that allocates organization-defined security safeguards to organization-defined architectural layers.	Designer Non-Designer	---	Defining and documenting the security architecture using a defense-in-depth approach that allocates security safeguards defined in PL-8 (1), CCI-003084 to architectural layers defined in PL-8 (1), CCI 3086 for the control system device is met by implementation of the Cybersecurity Design Process as required by UFC 4-010-06 with the provision of the appropriate 25 05 11.XX UFGS Specification for the identified Control System(s). Then, the Contractor is required to provide baseline Control System Cybersecurity Documentation at project end for all Control System, subsystems, and devices as a submittal requirement as part of the full and final Control System Cybersecurity Documentation. Upon final acceptance of the system the organization is responsible to continue to ensure that security architecture using a defense-in-depth approach is allocated for security safeguards defined in PL-8 (1), CCI-003084 to architectural layers defined in PL-8 (1), CCI-003086 for the control system device.
CCI-003083	PL-8(1)(a)	The organization defines the security safeguards to be allocated to organization-defined locations.	Designer Non-Designer	---	Defining and documenting the security safeguards to be allocated to organization-defined locations for the control system device is met by implementation of the Cybersecurity Design Process as required by UFC 4-010-06 with the provision of the appropriate 25 05 11.XX UFGS Specification for the identified Control System(s). Then, the Contractor is required to provide baseline Control System Cybersecurity Documentation at project end for all Control System, subsystems, and devices as a submittal requirement as part of the full and final Control System Cybersecurity Documentation. Upon final acceptance of the system the organization is responsible to continue to ensure that the security safeguards are allocated to organization-defined locations for the control system device.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-003084	PL-8(1)(a)	The organization defines the security safeguards to be allocated to organization-defined architectural layers.	Designer Non-Designer	---	Defining and documenting the security safeguards to be allocated to organization-defined architectural layers for the control system device is met by implementation of the Cybersecurity Design Process as required by UFC 4-010-06 with the provision of the appropriate 25 05 11.XX UFGS Specification for the identified Control System(s). Then, the Contractor is required to provide baseline Control System Cybersecurity Documentation at project end for all Control System, subsystems, and devices as a submittal requirement as part of the full and final Control System Cybersecurity Documentation. Upon final acceptance of the system the organization is responsible to continue to ensure that the security safeguards are allocated to organization-defined architectural layers for the control system device.
CCI-003085	PL-8(1)(a)	The organization defines the locations to which it allocates organization-defined security safeguards in the security architecture.	Designer Non-Designer	---	Defining and documenting the locations to which it allocates organization-defined security safeguards in the security architecture for the control system device is met by implementation of the Cybersecurity Design Process as required by UFC 4-010-06 with the provision of the appropriate 25 05 11.XX UFGS Specification for the identified Control System(s). Then, the Contractor is required to provide baseline Control System Cybersecurity Documentation at project end for all Control System, subsystems, and devices as a submittal requirement as part of the full and final Control System Cybersecurity Documentation. Upon final acceptance of the system the organization is responsible to continue to ensure that organization-defined security safeguards in the security architecture for the control system device.
CCI-003086	PL-8(1)(a)	The organization defines the architectural layers to which it allocates organization-defined security safeguards in the security architecture.	Designer Non-Designer	---	Defining and documenting the architectural layers to which it allocates organization-defined security safeguards in the security architecture for the control system device is met by implementation of the Cybersecurity Design Process as required by UFC 4-010-06 with the provision of the appropriate 25 05 11.XX UFGS Specification for the identified Control System(s). Then, the Contractor is required to provide baseline Control System Cybersecurity Documentation at project end for all Control System, subsystems, and devices as a submittal requirement as part of the full and final Control System Cybersecurity Documentation. Upon final acceptance of the system the organization is responsible to continue to ensure allocation of organization-defined security safeguards in their security architecture throughout the lifecycle of the system.
CCI-003087	PL-8(1)(b)	The organization designs its security architecture using a defense-in-depth approach that ensures that the allocated security safeguards operate in a coordinated and mutually reinforcing manner.	Designer Non-Designer	---	The organization is responsible for designing its security architecture using a defense-in-depth approach that ensures that the allocated security safeguards operate in a coordinated and mutually reinforcing manner.
CCI-003101	SA-4(2)	The organization requires the developer of the information system, system component, or information system service to provide design information for the security controls to be employed that includes security-relevant external system interfaces, high-level design, low-level design, source code, hardware schematics and/or organization-defined design/information at organization-defined level of detail.	Designer Non-Designer Impractical	---	Non-Designer; The organization is responsible to address this control.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-003102	SA-4(2)	The organization requires the developer of the information system, system component, or information system service to provide implementation information for the security controls to be employed that includes security-relevant external system interfaces, high-level design, low-level design, source code and/or hardware schematics organization-defined implementation information at organization-defined level of detail.	Designer Non-Designer Impractical	---	Non-Designer; The organization is responsible to address this control.
CCI-003103	SA-4(2)	The organization defines the design information that the developer of the information system, system component, or information system service is required to provide for the security controls to be employed.	Designer Non-Designer Impractical	---	Non-Designer; The organization is responsible to address this control.
CCI-003104	SA-4(2)	The organization defines the implementation information that the developer of the information system, system component, or information system service is required to provide for the security controls to be employed.	Designer Non-Designer Impractical	---	Non-Designer; The organization is responsible to address this control.
CCI-003105	SA-4(2)	The organization defines the level of detail the design information of the security controls is required to be provided by the developer of the information system, system component, or information system services.	Designer Non-Designer Impractical	---	Non-Designer; The organization is responsible to address this control.
CCI-003106	SA-4(2)	The organization defines the level of detail the implementation information of the security controls is required to be provided by the developer of the information system, system component, or information system services.	Designer Non-Designer Impractical	---	Non-Designer; The organization is responsible to address this control.
CCI-003114	SA-4(9)	The organization requires the developer of the information system, system component, or information system service to identify early in the system development life cycle, the functions, ports, protocols, and services intended for organizational use.	Designer Non-Designer Impractical	---	Non-Designer; The organization is responsible to address this control.
CCI-003116	SA-4(10)	The organization employs only information technology products on the FIPS 201-approved products list for Personal Identity Verification (PIV) capability implemented within organizational information systems.	Enclave Designer Impractical	FIPS 201-2 REQUIREMENT	Not Applicable. Control system is not on the FIPS 201-2 approved Product list. Fire and Life Safety device(s) do not support PIV.
CCI-003124	SA-5(a)(1)	The organization obtains administrator documentation for the information system, system component, or information system services that describes secure configuration of the system, component, or service.	Designer Non-Designer	Control System Cybersecurity Documentation	This is met by requiring the contractor to provide documentation that describes secure configuration of the device where this is applicable, or documentation stating that specifically that there are no secure configuration steps that apply.
CCI-003125	SA-5(a)(1)	The organization obtains administrator documentation for the information system, system component, or information system services that describes secure installation of the system, component, or service.	Designer Non-Designer	Control System Cybersecurity Documentation	For Controllers and other devices where applicable - This is met by requiring the contractor to provide documentation that describes the secure installation of the device.
CCI-003126	SA-5(a)(1)	The organization obtains administrator documentation for the information system, system component, or information system services that describes secure operation of the system, component, or service.	Designer Non-Designer	Control System Cybersecurity Documentation	This is met by requiring the contractor to provide a Control System Cybersecurity Documentation submittal for the information system, system component or information system service that describe secure operation of the system, component, or service, and containing the indicated information for each device and software application in accordance with CCI-003124, CCI-003125, CCI-003127, CCI-003128, CCI-003129, CCI-003130, and CCI-003131
CCI-003127	SA-5(a)(2)	The organization obtains administrator documentation for the information system, system component, or information system services that describes effective use and maintenance of security functions/mechanisms.	Designer Non-Designer	Control System Cybersecurity Documentation	For Controllers and other devices where applicable - This is met by requiring the contractor to provide documentation that describes effective use and maintenance of security functions or mechanisms for the device; or a specific indication that there are no security functions or mechanisms in the device.

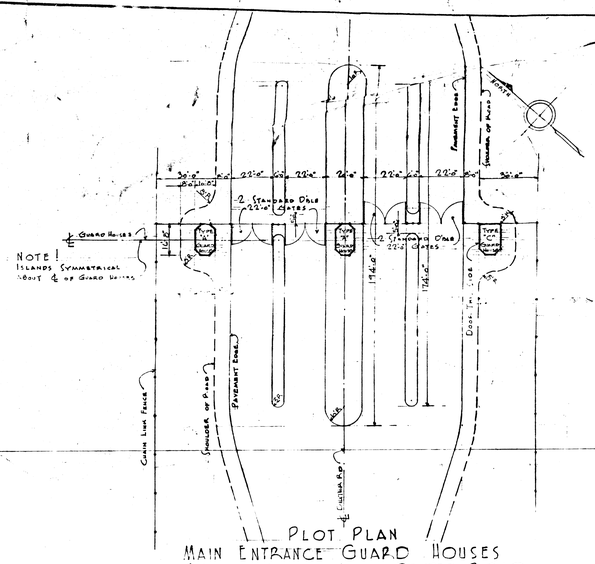
CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-003128	SA-5(a)(3)	The organization obtains administrator documentation for the information system, system component, or information system services that describes known vulnerabilities regarding configuration and use of administrative (i.e. privileged) functions.	Designer Non-Designer	Control System Cybersecurity Documentation	For Controllers and other devices where applicable - This is met by requiring the contractor to provide Documentation that describes known vulnerabilities regarding configuration and use of administrative (i.e. privileged) functions for the device.
CCI-003129	SA-5(b)(1)	The organization obtains user documentation for the information system, system component, or information system service that describes user-accessible security functions/mechanisms and how to effectively use those security functions/mechanisms.	Designer Non-Designer	Control System Cybersecurity Documentation	For Controllers and other devices where applicable - This is met by requiring the contractor to provide documentation that describes user-accessible security functions or mechanisms in the device and how to effectively use those security functions or mechanisms; or a specific indication that there are no user-accessible security functions or mechanisms in the device.
CCI-003130	SA-5(b)(2)	The organization obtains user documentation for the information system, system component or information system service that describes methods for user interaction which enables individuals to use the system, component, or service in a more secure manner.	Designer Non-Designer	Control System Cybersecurity Documentation	For Controllers and other devices where applicable - This is met by requiring the contractor to provide documentation that describes methods for user interaction which enables individuals to use the device in a more secure manner.
CCI-003131	SA-5(b)(3)	The organization obtains user documentation for the information system, system component or information system service that describes user responsibilities in maintaining the security of the system, component, or service.	Designer Non-Designer	Control System Cybersecurity Documentation	For Controllers and other devices where applicable - This is met by requiring the contractor to provide documentation that describes user responsibilities in maintaining the security of the device
CCI-003155	SA-10(a)	The organization requires the developer of the information system, system component, or information system service to perform configuration management during system, component or service design, development, implementation and/or operation.	Designer Non-Designer Impractical	---	The organization is responsible for requiring the developer of the control system, system component, or control system service to perform configuration management during system, component or service design, development, implementation and/or operation. The configuration management process applies to: 1. Documentation developed or used in the lifecycle, including requirements and interface specifications; 2. Elements including design libraries; 3. Tools including design tools and test tools; 4. Technical data including test data; and 5. Information on element and system lifecycle processes
CCI-003156	SA-10(b)	The organization requires the developer of the information system, system component, or information system service to document the integrity of changes to organization-defined configuration items under configuration management.	Designer Non-Designer Impractical	---	The organization is responsible for requiring the developer of the control system, system component, or control system service to document the integrity of changes to organization-defined configuration items under configuration management.
CCI-003157	SA-10(b)	The organization requires the developer of the information system, system component, or information system service to manage the integrity of changes to organization-defined configuration items under configuration management.	Designer Non-Designer Impractical	---	The organization is responsible for requiring the developer of the control system, system component, or control system service to manage the integrity of changes to organization-defined configuration items under configuration management.
CCI-003158	SA-10(b)	The organization requires the developer of the information system, system component, or information system service to control the integrity of changes to organization-defined configuration items under configuration management.	Designer Non-Designer Impractical	---	The organization is responsible for requiring the developer of the control system, system component, or control system service to control the integrity of changes to organization-defined configuration items under configuration management.
CCI-003159	SA-10(b)	The organization defines the configuration items under configuration management that require the integrity of changes to be documented, managed and controlled.	Designer Non-Designer Impractical	---	The organizationis responsible for defining the configuration items under configuration management that require the integrity of changes to be documented, managed and controlled.
CCI-003160	SA-10(d)	The organization requires the developer of the information system, system component, or information system service to document the potential security impacts of approved changes to the system, component, or service.	Designer Non-Designer Impractical	---	The organization is responsible for requiring the developer of the control system, system component, or control system service to document the potential security impacts of approved changes to the system, component, or service.

CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-003161	SA-10(e)	The organization requires the developer of the information system, system component, or information system service to track security flaws within the system, component, or service.	Designer Non-Designer Impractical	---	The organization is responsible for requiring the developer of the control system, system component, or control system service to track security flaws within the system, component, or service.
CCI-003162	SA-10(e)	The organization requires the developer of the information system, system component, or information system service to track flaw resolution within the system, component, or service.	Designer Non-Designer Impractical	---	The organization is responsible for requiring the developer of the control system, system component, or control system service to track flaw resolution within the system, component, or service.
CCI-003163	SA-10(e)	The organization requires the developer of the information system, system component, or information system service to report security flaws and flaw resolution within the system, component, or service findings to organization-defined personnel.	Designer Non-Designer Impractical	---	The organization is responsible for requiring the developer of the control system, system component, or control system service to report security flaws and flaw resolution within the system, component, or service findings to organization-defined personnel.
CCI-003171	SA-11(a)	The organization requires the developer of the information system, system component, or information system service to create a security assessment plan.	Designer Non-Designer Impractical	CONTROL SYSTEM CYBERSECURITY TESTING	This CCI is impractical because the control system is incapable of supporting it.
CCI-003172	SA-11(a)	The organization requires the developer of the information system, system component, or information system service to implement a security assessment plan.	Designer Non-Designer Impractical	CONTROL SYSTEM CYBERSECURITY TESTING	This CCI is impractical because the control system is incapable of supporting it.
CCI-003173	SA-11(b)	The organization requires the developer of the information system, system component, or information system service to perform unit, integration, system, and/or regression testing/evaluation at organization-defined depth and coverage.	Designer Non-Designer Impractical	CONTROL SYSTEM CYBERSECURITY TESTING	The organization is responsible for requiring the developer of the control system, system component, or control system service to perform unit, integration, system, and/or regression testing/evaluation at organization-defined depth and coverage.
CCI-003174	SA-11(b)	The organization defines the depth and coverage to perform unit, integration, system, and/or regression testing/evaluation.	Designer Non-Designer Impractical	CONTROL SYSTEM CYBERSECURITY TESTING	The organization is responsible for defining the depth and coverage to perform unit, integration, system, and/or regression testing/evaluation.
CCI-003175	SA-11(c)	The organization requires the developer of the information system, system component, or information system service to produce evidence of the execution of the security assessment plan.	Designer Non-Designer Impractical	CONTROL SYSTEM CYBERSECURITY TESTING	This CCI is impractical because the control system is incapable of supporting it.
CCI-003176	SA-11(c)	The organization requires the developer of the information system, system component, or information system service to produce the results of the security testing/evaluation.	Designer Non-Designer Impractical	CONTROL SYSTEM CYBERSECURITY TESTING	This CCI is impractical because the control system is incapable of supporting it.
CCI-003177	SA-11(d)	The organization requires the developer of the information system, system component, or information system service to implement a verifiable flaw remediation process.	Designer Non-Designer Impractical	CONTROL SYSTEM CYBERSECURITY TESTING	This CCI is impractical because the control system is incapable of supporting it.
CCI-003178	SA-11(e)	The organization requires the developer of the information system, system component, or information system service to correct flaws identified during security testing/evaluation.	Designer Non-Designer Impractical	CONTROL SYSTEM CYBERSECURITY TESTING	This CCI is impractical because the control system is incapable of supporting it.
CCI-003233	SA-15	The organization requires the developer of the information system, system component, or information system service to follow a documented development process.	Designer Impractical	---	This is met by implementation of the Cybersecurity Design Process as required by UFC 4-010-06 with the provision of the appropriate 25 05 11 UFGS Specification for the identified Control System(s). The Contractor is required to execute the government approved, Issued For Construction specification of the appropriate 25 05 11.XX which ensures that the Lead Engineer/developer of the control system, system component, or control system service follows the documented development process as outlined in the UFC.

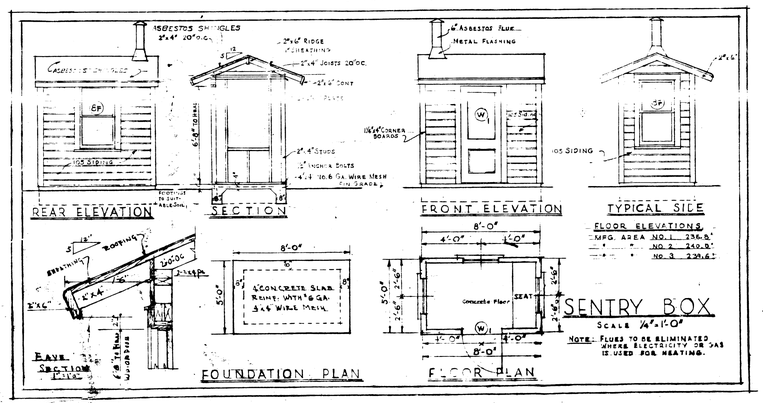
CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-003234	SA-15(a)(1)	The documented information system, system component, or information system service development process explicitly addresses security requirements.	Designer Impractical	---	This is met by implementation of the Cybersecurity Design Process as required by UFC 4-010-06 with the provision of the appropriate 25 05 11 UFGS Specification for the identified Control System(s). The Contractor is required to execute the government approved, Issued For Construction specification of the appropriate 25 05 11.XX which ensures that the Lead Engineer/developer follows this documented development process for the control system, system component, or control system service development process which explicitly to addressed security requirements in accordance with this UFC.
CCI-003235	SA-15(a)(2)	The documented information system, system component, or information system service development process identifies the standards used in the development process.	Designer Impractical	---	This is met by implementation of the Cybersecurity Design Process as required by UFC 4-010-06 with the provision of the appropriate 25 05 11 UFGS Specification for the identified Control System(s). The Contractor is required to execute the government approved, Issued For Construction specification of the appropriate 25 05 11.XX which ensures that the Lead Engineer/developer provides the documentation for the control system, system component, or control system service development process which identifies the standards used in the development process according in accordance with this UFC.
CCI-003236	SA-15(a)(2)	The documented information system, system component, or information system service development process identifies the tools used in the development process.	Designer Impractical	---	This is met by implementation of the Cybersecurity Design Process as required by UFC 4-010-06 with the provision of the appropriate 25 05 11 UFGS Specification for the identified Control System(s). The Contractor is required to execute the government approved, Issued For Construction specification of the appropriate 25 05 11.XX which ensures that the Lead Engineer/developer provides the documented control system, system component, or control system service development process identifying the tools used in the development process in accordance with this UFC.
CCI-003237	SA-15(a)(3)	The documented information system, system component, or information system service development process documents the specific tool options and tool configurations used in the development process.	Designer Impractical	---	This is met by implementation of the Cybersecurity Design Process as required by UFC 4-010-06 with the provision of the appropriate 25 05 11 UFGS Specification for the identified Control System(s). The Contractor is required to execute the government approved, Issued For Construction specification of the appropriate 25 05 11.XX which ensures that the developer of the system, system component, or service documents the specific tool options and tool configurations used in the development process. The government organization is responsible for oversight to ensure the contractor executes the appropriate 25 05 11.XX contracts/agreements related to the control system
CCI-003238	SA-15(a)(4)	The documented information system, system component, or information system service development process documents changes to the process and/or tools used in development.	Designer Impractical	---	This is met by implementation of the Cybersecurity Design Process as required by UFC 4-010-06 with the provision of the appropriate 25 05 11 UFGS Specification for the identified Control System(s). The Contractor is required to execute the government approved, Issued For Construction specification of the appropriate 25 05 11.XX which ensures that the developer of the system, system component, or service documents any changes to the process and/or tools used in development process. The government organization is responsible for oversight to ensure the contractor executes the appropriate 25 05 11.XX contracts/agreements related to the control system.

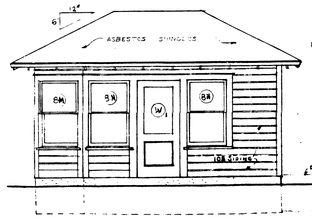
CCI	800-53 Control Text Indicator	CCI Definition	Responsibility	UFGS Reference	Implementation Status
CCI-003239	SA-15(a)(4)	The documented information system, system component, or information system service development process manages changes to the process and/or tools used in development.	Designer Impractical	---	This is met by implementation of the Cybersecurity Design Process as required by UFC 4-010-06 with the provision of the appropriate 25 05 11 UFGS Specification for the identified Control System(s). The Contractor is required to execute the government approved, Issued For Construction specification of the appropriate 25 05 11.XX which ensures that the developer of the system, system component, or service manages changes to the process and/or tools used in development of the system. The government organization is responsible for oversight to ensure the contractor executes the appropriate 25 05 11.XX contracts/agreements related to the control system.
CCI-003240	SA-15(a)(4)	The documented information system, system component, or information system service development process ensures the integrity of changes to the process and/or tools used in development.	Designer Impractical	---	This is met by implementation of the Cybersecurity Design Process as required by UFC 4-010-06 with the provision of the appropriate 25 05 11 UFGS Specification for the identified Control System(s). The Contractor is required to execute the government approved, Issued For Construction specification of the appropriate 25 05 11 which ensures that the developer of the system, system component, or service ensures the integrity of changes to the process and/or tools used in development of the system. The government organization is responsible for oversight to ensure the contractor executes the appropriate 25 05 11.XX contracts/agreements related to the control system.

APPENDIX Q
AS-BUILT DRAWINGS FOR EXISTING BUILDINGS

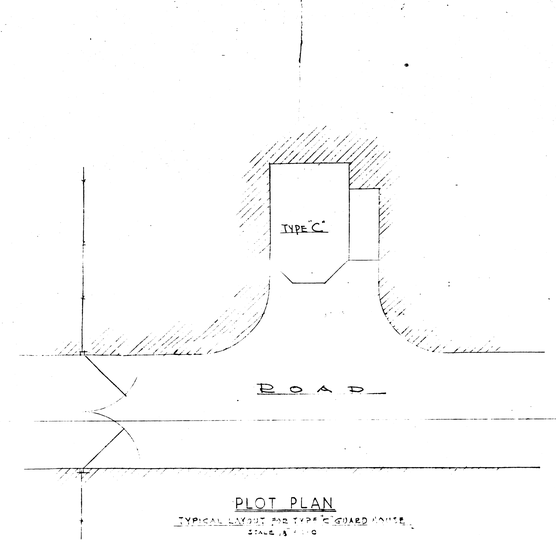


PLOT PLAN
MAIN ENTRANCE GUARD HOUSES
ADMINISTRATION AREA - DEXTER ROAD
1" = 30'-0"

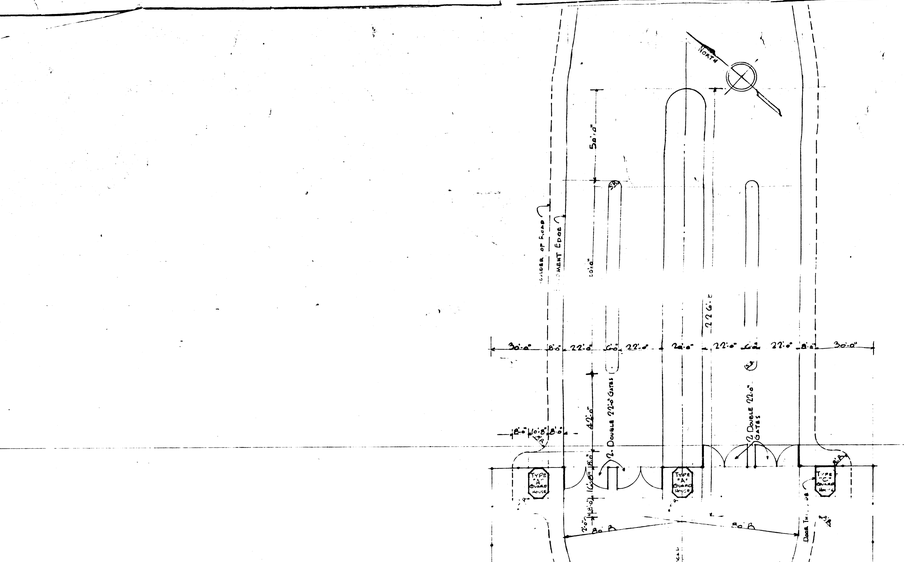




FRONT ELEVATION TYPE C
SCALE ¼"-1'-0"



PLOT PLAN
TYPICAL LAYOUT FOR TYPE 'C' GUARD HOUSE
SCALE 1" = 30'-0"



PLOT PLAN
MAIN ENTRANCE GUARD HOUSES
ADMINISTRATION AREA - PLAINVIEW ROAD
1" = 30'-0"
See Dwg. PB-195-E

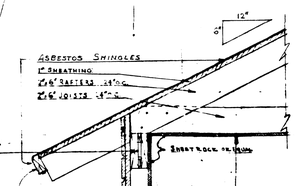
DATE	NO.	DESCRIPTION	INITIATED	APVD.
12-30-42	3	SCHEDULE REVISED	LONG	LONG
5-6-42	2	REVISED DEXTER & PLAINVIEW RD. ENTRANCES CHANGED C'TRACTOR'S NAME AND AREA	SIMPSON	H.B.
3/30/42	1	WINDOW CHANGE & GENERAL REVS	J.C.J.	R.S.M.

REVISIONS

SCHEDULE

NO. REQ.	TYPE	BLDG. NO.	LOCATION	HEATED
7	B	702, 704, 707	DEXTER ROAD ENT. TO ADMINIST. AREA	ELECTRICITY
2	A	708 & 710	PLAINVIEW " " MFG "	"
1	[illegible]	712	ROUTE 5 - STORAGE ROAD	"
1	[illegible]	[illegible]	[illegible]	[illegible]
1	A	704	" " NORTH "	OIL
1	A	713	ADMINISTRATION AREA-FRONT "	"
1	A	D2206	DEPOT AREA "	"
1	Battery	502	TOXIC STORAGE YARD	ELECTRICITY
1	"	780	COTTON BELT R.R. ENTRANCE TO AREA	OIL
3	"	783, 782 & 784	MANUFACTURING AREAS 1, 2 & 3	"
1	"	784	MISSOURI PACIFIC ENTRANCE TO AREA	"
1	"	785	OPEN BOMB STORAGE	"

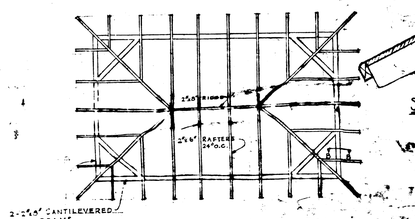
NOTE: BUILDINGS 704, 708 & 712 TO HAVE INDOOR SANITARY TOILETS. (AGO Memo CMC-43)



1¾" Double Hung Sash with Balances

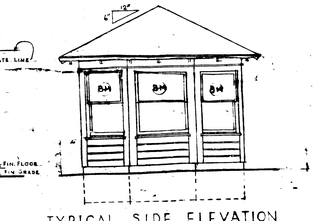
DOOR JAMB-DETAIL-CORNER OF BLDG.
Scale 1½"-1'-0"

SECTION A-A
Scale ¼"-1'-0"

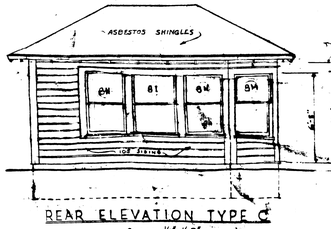


SECTION B-B
Scale 1"-1'-0"

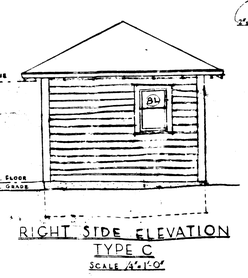
ROOF FRAMING PLAN
Scale 1"-1'-0"



FRONT ELEVATION TYPE A
REAR ELEVATION TYPE A
SCALE ¼"-1'-0"

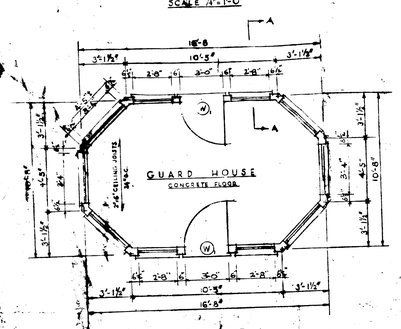


REAR ELEVATION TYPE C
SCALE ¼"-1'-0"

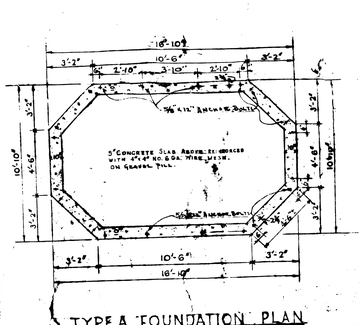


RIGHT SIDE ELEVATION
TYPE C
SCALE ¼"-1'-0"

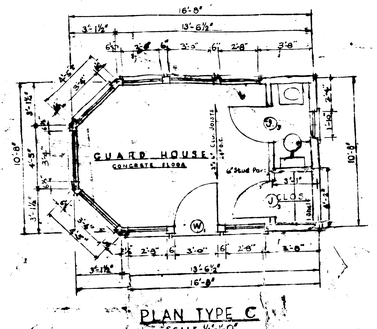
NOTE
THERE ARE 7 GUARD HOUSES A
THERE ARE 4 GUARD HOUSES C
THERE ARE 7 SENTRY BOXES.



PLAN TYPE A
SCALE ¼"-1'-0"



TYPE A FOUNDATION PLAN
SCALE ¼"-1'-0"



PLAN TYPE C
SCALE ¼"-1'-0"

APPROVED
FOR CONSTRUCTION

SANDERSON & PORTER
ENGINEERS & CONTRACTORS
APPROVED BY
CHIEF ENGINEER
1-31-42

11-010 AR-1
REFERENCE DRAWINGS

DRAWINGS MADE BY	TITLE	DWG. NO.
SANDERSON & PORTER	STD. WINDOW & DOOR SCHEDULE	P.B.-534-E
" "	TRAFFIC LANES & GATE HOUSES	P.B.-195-A-1
" "	ARMS, FENCE & GUARD HOUSES	P.B.-64-A-D
" "	ELECTRIC HEATING LAYOUT	P.B.-347-E-4

Record Drawings

PLANS FOR BLDGS 11-010, 11-020, 11-030

SCALE AS NOTED

CONSTRUCTION DIVISION
OFFICE OF THE QUARTERMASTER GENERAL
PINE BLUFF ARSENAL
GUARD HOUSES-ARCE
SENTRY BOX

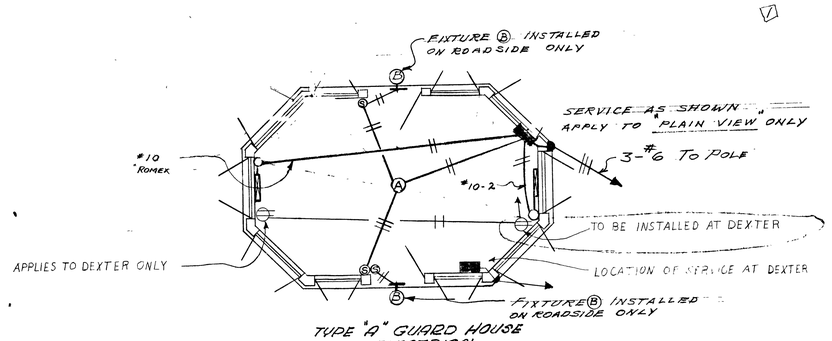
Drawn By FRABELLA | Checked By J.C.J. | Approved by Direction | Date

Traced By | Approved By

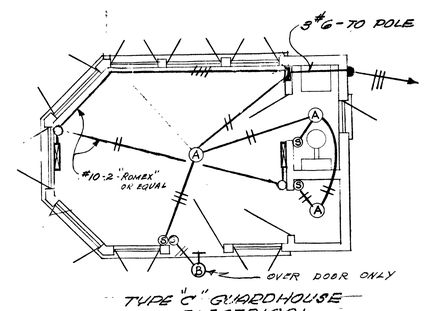
APPROVED FOR CHEMICAL WARFARE SERVICE
DATE Feb 3 1942

11-010 AR-1

GUARD HOUSES WIRED FOR LIGHTS ONLY
WHEN GAS HEAT IS AVAILABLE
FOR GUARD HOUSES TO BE WIRED
WITH ELECTRICAL HEAT
SEE ARCHITECTURAL DWG. # P.B. 343-A-2



TYPE "A" GUARD HOUSE ELECTRICAL



TYPE "C" GUARD HOUSE ELECTRICAL

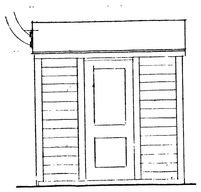
ALL WIRING TO BE IN NON-METALIC SHEATHED CABLE

NOTE: FOR INFORMATION REGARDING BLDGS. 24-010 & 24-020 SEE DWG. 24010-EL-2

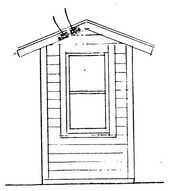
SYMBOLS

- (A) 100 Watt {10" glass - 4" fitter / commercial glass} fixture, ceiling type.
- ○ Outlet for heater unit
- ● Toggle switch, S.P.
- ▬ Industrial air heater, 3000 watt, 3 heat snap switch, suitable for 230 volts. G.E. #2A137, horizontal, wall mounted.
- ▮ Distribution Panel, 3W-120/220 volt 2-20 A. S.P. Breakers 2-20 A. 2P. Breaker
- (B) 100 WATT R.L.M. ANGLE REFLECTORS WITH RIGHT ANGLE HOOD
- ⊖ RECETACLE, DUPLEX, 125 V, 15 A

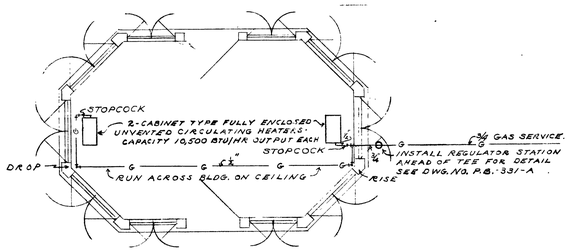
1. All wires, fixtures and equipment shall be installed and grounded in accordance with the latest rules and regulations of the National Board of Fire Underwriters and all electrical materials shall bear the label of the Underwriters Laboratories, Inc.
2. No wires smaller than #14 A.W.G. shall be used in any branch circuit. Conductor shall be continuous from outlet to outlet and no splice shall be made except within outlet boxes.



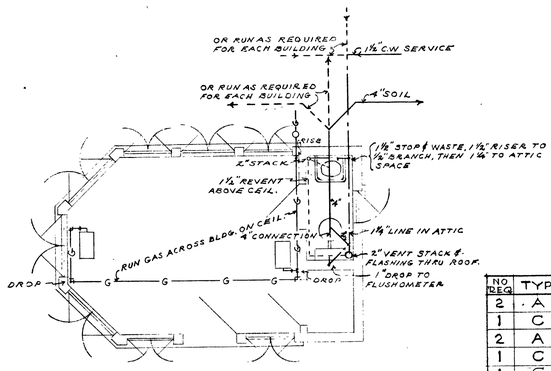
FRONT ELEVATION



TYPICAL SIDE

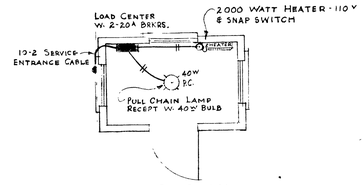


HEATING PLAN ONLY
TYPE "A" GUARD HOUSE
SCALE - ¼" = 1'-0"



PLUMBING & HEATING PLAN
TYPE "C" GUARD HOUSE
SCALE - ¼" = 1'-0"

NOTE - FOR HEATING EQUIPMENT, SIZES AND CONNECTIONS, USE DATA OF TYPE "A" HOUSE.



FLOOR PLAN
ELECTRICAL

SENTRY BOX

BUILDING SCHEDULE

NO REQ	TYPE	B'LD'G NO.	LOCATION	HEAT
2	A	705 & 706	DEXTER ROAD ENT. TO ADM. AREA	ELECTRIC
1	C	707	" " " " " "	"
2	A	709 & 710	PLAINVIEW " " " MFG	"
1	C	711	" " " " " "	"
1	C NO PLUMBING	712	ROUTE 5 — STORAGE ROAD	"
1	C NO PLUMBING	708	McFADDEN ROAD-SOUTH ENT.	"
1	C NO PLUMBING	704	" " -NORTH "	OIL
1	A	713	ADMINISTRATION AREA-FRONT "	"
1	A	D-2002	DEPOT AREA	"
1	SENTRY BOX	502	TOXIC STORAGE YARD	ELECTRIC
1	"	780	COTTON BELT R.R. ENT. TO AREA	OIL
3	"	783, 782 & 781	MANUFACTURING AREAS 1, 2 & 3	"
1	"	784	MISSOURI PACIFIC ENT. TO AREA	"
1	"	785	OPEN BOMB STORAGE	"

NOTE: BUILDINGS 704, 708 & 712 TO HAVE INDOOR SANITARY TOILETS (AREA ENG. 1-23-42)

6-17-69	6	ADDED "NOTE:-----"	BWR		
2-4-69	5	RECEPTACLE ADDED AT DEXTER	DJD		
12-31-42	4	BUILDING SCHEDULE ADDED	LONG	LONG	
		SENTRY BOX ELECTRICAL ADDED	JGH	E.M. O.S.M.	CAN 7-24-42
7-21-42	3		E.M.	O.S.M.	CAN 7-24-42
7-11-42	2	OUTSIDE FIXTURES ADDED	E.M.	O.S.M.	CAN 7-24-42
5/22/42	1	REVISIONS, KEY & ADDED NTS. TO SUIT ARCH'L REVISION & REV. LOCATIONS.	E.M.	O.S.M.	W.V.B. 5-25-42
5-21-42	1	CONDUIT DELETED	E.M.	O.S.M.	
DATE	NO.				

Bldgs 24-010, 24-020, & 24-030

H. Van Boren
1-29-42

Wm Prentice
Jan 21/1942

APPROVED
AREA ENGINEER

		ENG. NO.
S & P	PLOT PLAN	PB-64-A
S & P	ARCHITECTURAL	PB-343-A-2

Record Drawings

Record Drawings

OFFICE OF [illegible]
ROUTE AREA ENGINEER

1/4" = 1'-0"

GUARD HOUSES (AND SENTRY BOX)
ELECTRICAL LAYOUT
PLUMBING & HEATING PLAN

MOORE R.W.S
WOOD O.S.M.
HELLMERS H.L.T.

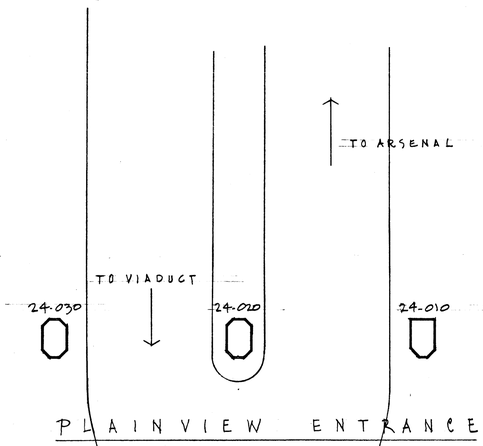
James A. Lopez JAN. 29, 1942
Captain C.E.
Area Engr.

P-77256-42-1
P.B-329-B-4

ELEC.	REV.	SEWAGE	R.R. & HIGHWAY	REV.	ARCH.	STRUCT	REV.	MECH.	REV.	V.B.F. ENG.	REVISION	AREA ENGINEER	REVISION
O.S.M. 7-11-42 E.M. 7-11-42												RECORD DRAWING	24010 EL-1

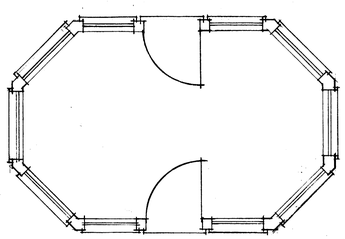
SCHEDULE OF WORK

1. EXTERIOR PAINTING. COMPLETELY SAND, SCRAPE, AND REMOVE ALL OLD PAINT. SEE SCHEDULE OF WORK! PAINT AS DESCRIBED IN OUTLINE SPEC.
2. INTERIOR PAINTING. CLEAN, LIGHTLY SAND, AND DUST. USE LIQUID CLEANER AS REQUIRED. TOUCH UP SMUDGES, BLEMISHES, ETC. WITH PIGMENTED SHELLAC PRIOR TO APPLICATION POLY. VINYL WALL SEALER. PAINT AS DESCRIBED IN OUTLINE SPECIFICATION. PAINT RUSTED LIGHT FIXTURES. USE METAL PRIMER PRIOR TO PAINTING.

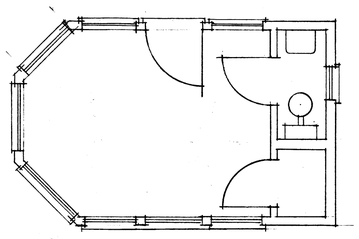


PLAINVIEW ENTRANCE

PLOT PLAN
SCALE: 1" = 30'-0"

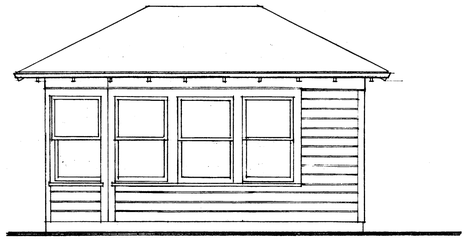


PLAN - BLDGS. 24-020 and 24-030

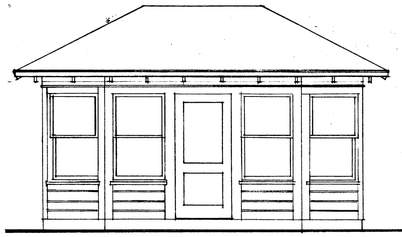


PLAN - BLDG. 24-010

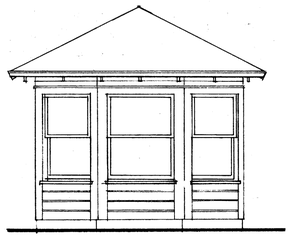
SCALE: PLANS - 1/4" = 1'-0"



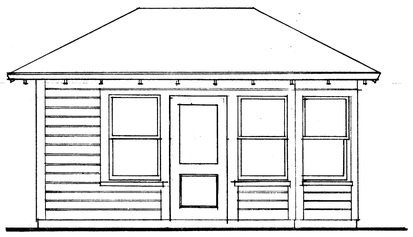
SOUTH ELEVATION - BLDG. 24-010



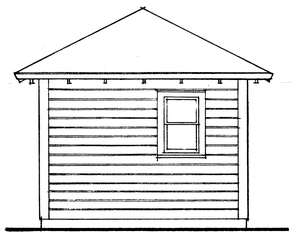
NORTH and SOUTH ELEVATIONS
BLDGS. 24-020 and 24-030



EAST and WEST ELEVATIONS
BLDGS. 24-020 and 24-030
(ALSO WEST ELEVATION - 24-010)



NORTH ELEVATION - BLDG. 24-010



EAST ELEVATION - BLDG. 24-010

SCALE: ALL ELEVATIONS - 1/4" = 1'-0"

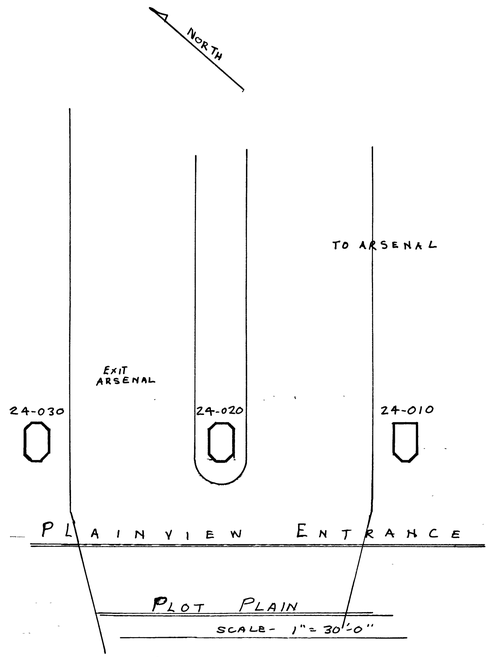
NO	DATE	ITEM REVISION	BY	APP'D

ARCHITECTURAL
INTERIOR and EXTERIOR PAINTING
BLDGS. 24-010, 24-020, and 24-030

SCALE	DATE	DRAWN	DES	DESIGNER	CHECK	OPERATIONS	SAFETY	SECURITY	FIRE
AS NOTED	9/21/77	GH	GH	GH	JCW	JCW	JCW	JCW	

DEPARTMENT OF THE ARMY
PINE BLUFF ARSENAL
DIRECTORATE OF FACILITIES

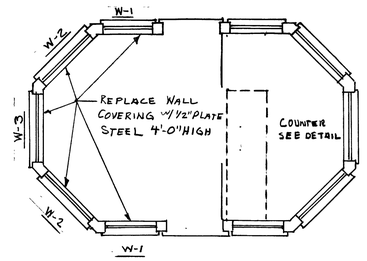
		DRAWING NO.	SHEET
SUBMITTED	George H. Schwinge Jr	24010 AR-1	1 OF 1
APPROVED	Dolph K. Hoff		



PLAIN VIEW ENTRANCE

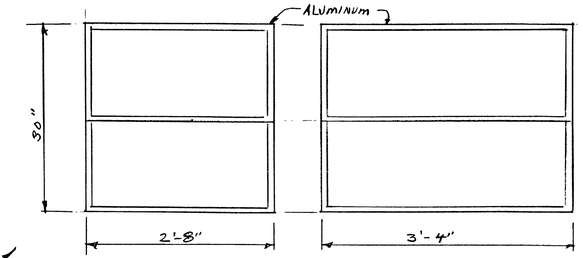
PLOT PLAIN

SCALE- 1"=30'-0"

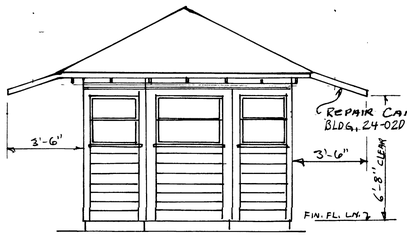


FLOOR PLAN BLDGS. 24-020 & 24-030

SCALE- 1/4"=1'-0"

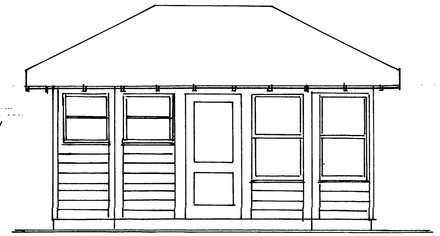


WINDOW SCHEDULE



WEST ELEVATION 24-020 & 24-030 & 24-010

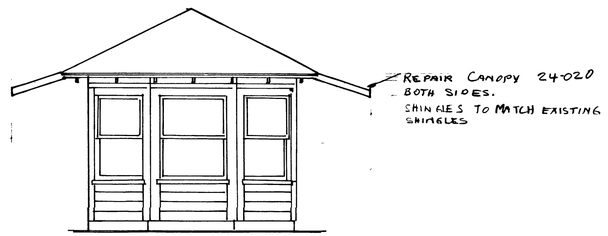
SCALE - 1/4"=1'-0"



SOUTH ELEVATION 24-020 & 24-030

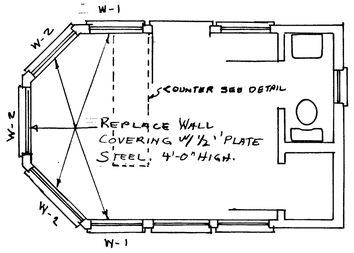
SCALE- 1/4"=1'-0"

NORTH ELEV. SAME BUT OPPOSITE



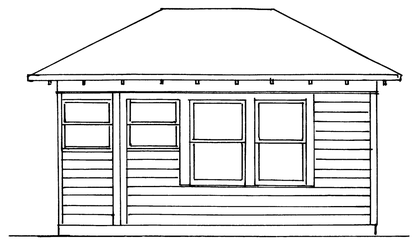
EAST ELEVATION 24-020 & 24-03

SCALE- 1/4"=1'-0"



FLOOR PLAN BLDG. 24-010

SCALE- 1/4"=1'-0"

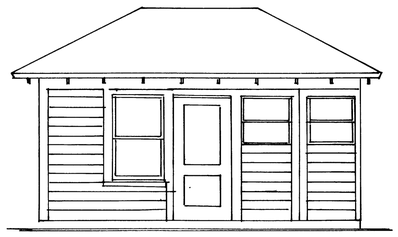


SOUTH ELEVATION - BLDG. 24-010

SCALE - 1/4"=1'-0"

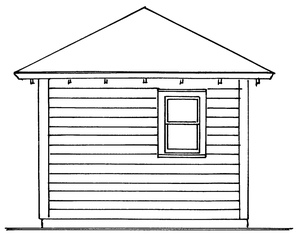
WORK TO BE DONE

1. REPLACE WINDOWS AS SHOWN
2. REPLACE WALL COVERING W/1/2" PLATE STEEL INTERIOR
3. REPAIR CANOPY
4. INSTALL COUNTERS
5. INSTALL CRASH BARRIARS
6. PAINT INSIDES AND OUT SIDE



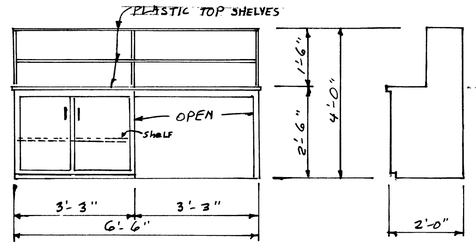
NORTH ELEVATION - BLDG. 24-010

SCALE- 1/4"=1'-0"



EAST ELEVATION - BLDG. 24-010

SCALE- 1/4"=1'-0"



ELEVATION

END VIEW

COUNTER DETAIL

SCALE- 1/2"=1'-0"

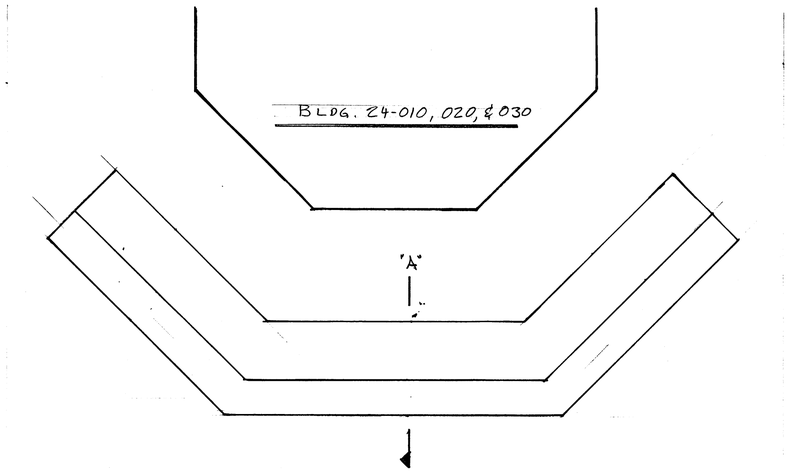
NO	DATE	ITEM REVISION	BY	APR'D

ARCHITECTURAL REPAIRS AND ALTERATION BLDG. 24-010, 020 & 030

SCALE	DATE	DRAWN	DESIGNER	CHECK	OPERATIONS	SAFETY	SECURITY	DPCO
AS NOTED	5-79	TEG	TEG					

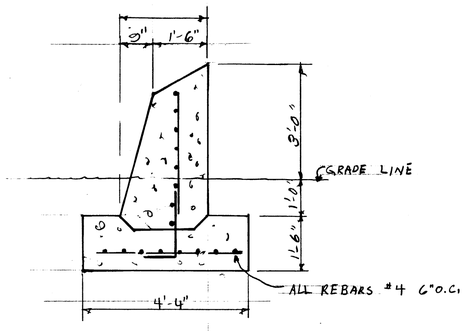
DEPARTMENT OF THE ARMY
PINE BLUFF ARSENAL
Directorate of Facilities Engineering

		DRAWING NO	SHEET
SUBMITTED	John M. Dougl	24-010 AR-2	1 OF 2
APPROVED	Harry D Holt		



CRASH BARRIER PLAN @ BLDG. 24-010, 24-020 & 24-030

SCALE - 1/2" = 1'-0"



SECTION "A"

SCALE: 1/2" = 1'-0"

NO	DATE	ITEM	BY	APR'D

REVISION

ARCHITECTURAL

REPAIRS AND ALTERATION

BLDG. 24-010, 020, & 030

SCALE	DATE	DRAWN	DESIGNER	CHECK	OPERATIONS	SAFETY	SECURITY	HQDA
AS NOTED	5-79	TLB	TLB					

DEPARTMENT OF THE ARMY

PINE BLUFF ARSENAL

Directorate of Facilities Engineering

SUBMITTED	DRAWING NO.	SHEET
APPROVED	24-010 AR-2	2 of 2

DEPARTMENT OF THE ARMY
U.S. ARMY MEDICAL CLINIC
PINE BLUFF ARSENAL

INDUSTRIAL HYGIENE OFFICE

7 APRIL 2014

MEMORANDUM FOR CLAYTON JOHNSON

SUBJECT: Asbestos Inspection/Assessment

Per your request, IH has conducted an asbestos inspection. The attached list of buildings or structures indicate where asbestos was collected or historical data indicated that asbestos was found during previous IH inspections. Some of the tanks and steam pipe lines were not accessible and a couple of the areas were not found. If you would show us where the places are that we missed, IH will collect those samples and get you results within the next week. The inspection was performed to comply with EPA, Arkansas Regulation 21, and OSHA Regulations. These regulations require that Asbestos Containing Materials (ACM) be identified in buildings and areas prior to renovation or demolition. Also, the inspection/assessment was conducted by an Arkansas Certified Inspector/Assessor. The inspection/assessment is required prior to letting the contract to prevent any delays to the project.

If you have any questions, please contact the undersigned at 3450 or 543-9887.

Lena Bohan

LENA M. BOHANNAN
Sr. Industrial Hygienist
US Army Occupational Health Clinic
ADEQ Licensed Asbestos Inspector #011541

Facility Reduction Program - FY13-18

4/7/2014

Facility No.	Status	Con Typ	Type	CC	Description	UM	Size	Demo FY	Notes	Column1
24010	Excess	SP	B	14113	ACCESS CNT FAC	SF	168	2013	PLAINVIEW - PEELING PAINT (POTENTIAL LEAD) & NO ASBESTOS	
32065	Closed	P	S	12471	HEAT FUEL ABV	GA	134,000	2016	TANK - POSSIBLE CHEMICALS - NO ASBESTOS ON EXTERIOR	
32070	Closed	P	B	14175	INDUST LAUNDRY	SF	17,865*	2014	NO ABESTOS BUT PEELING PAINT	
32335	Excess	P	S	41210	LIQ STR NONPROP	GA	50,000	2013	TANK - POSSIBLE CHEMICALS - NO ASBESTOS ON EXTERIOR	
33065	Closed	P	S	12471	HEAT FUEL ABV	GA	134,000	2016	TANK - POSSIBLE CHEMICALS - NO ASBESTOS ON EXTERIOR	
33150	Excess	P	B	61050	ADMIN GEN PURP	SF	1,600	MCA	ROOF MATERIAL, BLACK MASTIC AROUND ROOF VENTS, DEBRIS IN ATTIC, & PIPE INSULATION CONTAINS ASBESTOS	
34011	Closed	P	S	42312	LIQ STR PROP	GA	23,700	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	1
34012	Closed	P	S	42311	LIQ PROP FAC	GA	23,700	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	2
34013	Closed	P	S	42311	LIQ PROP FAC	GA	23,700	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	3
34014	Closed	P	S	41210	LIQ STR NONPROP	GA	23,700	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	4
34015	Closed	P	S	42311	LIQ PROP FAC	GA	23,700	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	5
34016	Closed	P	S	42311	LIQ PROP FAC	GA	23,700	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	6
34021	Closed	P	S	22685	AMMO PROD STR	SF	0	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	7
34022	Closed	P	S	22685	AMMO PROD STR	SF	0	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	8
34023	Closed	P	S	22685	AMMO PROD STR	SF	0	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	9
34024	Closed	P	S	22685	AMMO PROD STR	SF	0	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	10

Facility No.	Status	Con Typ	Type	CC	Description	UM	Size	Demo FY	Notes	Column1
34025	Closed	P	S	22685	AMMO PROD STR	SF	40	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	11
34026	Closed	P	S	22685	AMMO PROD STR	SF	0	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	12
34027	Closed	P	S	22685	AMMO PROD STR	SF	40	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	13
34031	Closed	P	S	42311	LIQ PROP FAC	GA	23,770	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	14
34032	Closed	P	S	41210	LIQ STR NONPROP	GA	23,770	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	15
34033	Closed	P	S	42311	LIQ PROP FAC	GA	23,770	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	16
34034	Closed	P	S	42311	LIQ PROP FAC	GA	23,770	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	17
34035	Closed	P	S	42311	LIQ PROP FAC	GA	23,770	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	18
34036	Closed	P	S	42311	LIQ PROP FAC	GA	23,770	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	19
34037	Closed	P	S	42312	LIQ STR PROP	GA	23,770	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	20
34042	Closed	P	S	22685	AMMO PROD STR	SF	40	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	21
34044	Closed	P	S	22685	AMMO PROD STR	SF	40	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	22
34046	Closed	P	S	22685	AMMO PROD STR	SF	40	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	23
34051	Closed	P	S	42311	LIQ PROP FAC	GA	23,770	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	24

Facility No.	Status	Con Typ	Type	CC	Description	UM	Size	Demo FY	Notes	Column1
34052	Closed	P	S	42311	LIQ PROP FAC	GA	23,770	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	25
34053	Closed	P	S	41210	LIQ STR NONPROP	GA	23,770	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	26
34054	Closed	P	S	42311	LIQ PROP FAC	GA	23,770	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	27
34055	Closed	P	S	42311	LIQ PROP FAC	GA	23,770	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	28
34056	Closed	P	S	42311	LIQ PROP FAC	GA	23,770	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	29
34057	Closed	P	S	42311	LIQ PROP FAC	GA	23,770	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	30
34061	Closed	P	S	22685	AMMO PROD STR	SF	40	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	31
34063	Closed	P	S	22685	AMMO PROD STR	SF	40	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	32
34065	Closed	P	S	22685	AMMO PROD STR	SF	40	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	33
34067	Closed	P	S	22685	AMMO PROD STR	SF	40	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	34
34071	Closed	P	S	42311	LIQ PROP FAC	GA	23,770	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	35
34072	Closed	P	S	42311	LIQ PROP FAC	GA	23,770	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	36
34073	Closed	P	S	42311	LIQ PROP FAC	GA	23,770	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	37
34074	Closed	P	S	42311	LIQ PROP FAC	GA	23,770	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	38

Facility No.	Status	Con Typ	Type	CC	Description	UM	Size	Demo FY	Notes	Column1
34075	Closed	P	S	42311	LIQ PROP FAC	GA	23,770	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	39
34076	Closed	P	S	42311	LIQ PROP FAC	GA	23,770	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	40
34077	Closed	P	S	42311	LIQ PROP FAC	GA	23,770	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	41
34081	Closed	P	S	22685	AMMO PROD STR	SF	40	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	42
34082	Closed	P	S	22685	AMMO PROD STR	SF	40	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	43
34083	Closed	P	S	22685	AMMO PROD STR	SF	40	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	44
34084	Closed	P	S	22685	AMMO PROD STR	SF	40	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	45
34085	Closed	P	S	22685	AMMO PROD STR	SF	40	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	46
34086	Closed	P	S	22685	AMMO PROD STR	SF	40	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	47
34087	Closed	P	S	22685	AMMO PROD STR	SF	40	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	48
34091	Closed	P	S	42311	LIQ PROP FAC	GA	23,770	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	49
34092	Closed	P	S	42311	LIQ PROP FAC	GA	23,770	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	50
34093	Closed	P	S	42311	LIQ PROP FAC	GA	23,770	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	51
34094	Closed	P	S	42311	LIQ PROP FAC	GA	23,770	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	52

Facility No.	Status	Con Typ	Type	CC	Description	UM	Size	Demo FY	Notes	Column1
34095	Closed	P	S	42311	LIQ PROP FAC	GA	23,770	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	53
34096	Closed	P	S	42311	LIQ PROP FAC	GA	23,770	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	54
34097	Closed	P	S	42311	LIQ PROP FAC	GA	23,770	2014	WHITE PHOSPHORUS TANKS BURIED - NO ASBESTOS GASSKETS OR CONCRETE FOR AREA THAT COULD BE SAMPLED	55
34133	Closed	SP	B	22670	CASE FILL PLANT	SF	144	MCA	TRANSITE SIDING & ELECTRICAL INSULATION CONTAINS ASBESTOS	
34150	Closed	P	S	12471	HEAT FUEL ABV	GA	84,000	2016	TANK - POSSIBLE CHEMICALS - NO ASBESTOS ON EXTERIOR	
34821		P	S	83140	IND WASTE TREAT	KG	5	2014	COULD NOT FIND TO SAMPLE	
34961		SP	B	44228	HAZ MAT STR	SF	391	MCA	UNDERGROUND STRUCTURE UNABLE TO SAMPLE.	
42750		SP	B	89131	SEW/WST STR TRT	SF	427	2013	UNDERGROUND STRUCTURE UNABLE TO SAMPLE.	
42911	Closed	P	B	44220	STR, GEN PURP	SF	240	MCA	ASBESTOS AND LEAD PAINT	
42980	Excess	P	S	12471	HEAT FUEL ABV	GA	12,000	2013	ALL BRICK	
44400	Closed	P	S	83310	INCINERATOR	TH	12	2013	RUSTED OUT (DISINTEGRATED) - UNABLE TO SAMPLE	
51650	Excess	SP	B	14165	FUEL/POL BUILD	SF	100	2013	TRANSITE WALL, TRANSITE SIDING, ROOF MATERIALS AND TRANSITE CEILING CONTAIN ASBESTOS.	
53219	Excess	SP	B	21885	MNT GEN PURPOSE	SF	1,198	2013	ALL ALUMINUM BUILDING	
53350	Closed	P	S	41210	LIQ STR NONPROP	GA	27,000	2014	RUSTED OUT (DISINTEGRATED) - UNABLE TO SAMPLE	
53450	Closed	P	S	41210	LIQ STR NONPROP	GA	27,000	2014	RUSTED OUT (DISINTEGRATED) - UNABLE TO SAMPLE	
55040	Excess	SP	B	21870	MNT STORAGE DOL	SF	960	2013	COULD NOT FIND BUILDING	