

C O N T R A C T D O C U M E N T S

**CENTRAL ARKANSAS WATER
JACK H. WILSON WTP RENEWAL AND RESILIENCY
CAW PROJECT NO. 5421
CAW JOB NO. 09098A**



**Arkansas Department of Agriculture Natural Resources Division
Project # 23-147
Loan # 02393-DW-L**

**CONSTRUCTION SPECIFICATIONS – 100% SUBMITTAL
OWNER CONTINGENCY EXPENDITURE #4**

July 7, 2026

PREPARED BY:

Hazen

IN PARTNERSHIP WITH



**BOARD OF COMMISSIONERS,
CENTRAL ARKANSAS WATER**

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**CENTRAL ARKANSAS WATER
LITTLE ROCK, ARKANSAS**

Jack H. Wilson Water Treatment Plant



**CONSTRUCTION SPECIFICATIONS
FOR
JACK H. WILSON WTP RENEWAL AND RESILIENCY
OWNER CONTINGENCY EXPENDITURE #4**

**60711-003
July 2026**

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SECTION 00 01 01
PROJECT TITLE PAGE

PROJECT MANUAL
FOR
JACK H. WILSON WTP RENEWAL AND RESILIENCY
OWNER CONTINGENCY EXPENDITURE #4

100% SUBMITTAL
60711-003
July 2026

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SECTION 01 14 00
COORDINATION WITH OWNER'S OPERATIONS

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Requirements for coordinating with Owner's operations during the Work and included requirements for tie-ins and shutdowns necessary to complete the Work without impact on Owner's operations except as allowed in this Section.
2. Contractor shall provide labor, materials, tools, equipment and incidentals shown, specified and required to coordinate with Owner's operations during the Work.

B. General Requirements:

1. Except for shutdowns specified in this Section, perform the Work such that Owner's facility remains in continuous satisfactory operation during the Project. Schedule and conduct the Work such that the Work does not: impede Owner's production or processes, create potential hazards to operating equipment and personnel, reduce the quality of the facility's products or effluent, or cause odors or other nuisances.
2. Work not specifically covered in this Section or in referenced Sections may, in general, be completed at any time during regular working hours in accordance with the General Conditions and Supplementary Conditions, subject to the requirements in this Section.
3. Contractor has the option of providing additional temporary facilities that can eliminate or mitigate a constraint without additional cost to Owner, provided such additional temporary facilities: do not present hazards to the public, personnel, structures, and equipment; that such additional temporary facilities do not adversely affect Owner's ability to comply with Laws and Regulations, permits, and operating requirements; that such temporary facilities do not generate or foster the generation of odors and other nuisances; and that requirements of the Contract Documents are fulfilled.
4. Coordinate shutdowns with Owner and Engineer. When possible, combine multiple tie-ins into a single shutdown to minimize impacts on Owner's operations and processes.
5. Do not shut off or disconnect existing operating systems, unless accepted by Engineer in writing. Operation of existing equipment will be by Owner unless

otherwise specified or indicated. Where necessary for the Work, Contractor shall seal or bulkhead Owner-operated gates and valves to prevent leakage that may affect the Work, Owner's operations, or both. Provide temporary watertight plugs, bulkheads, and line stops as required. After completing the Work, remove seals, plugs, bulkhead, and line stops to satisfaction of Engineer.

6. Contractor is responsible for draining, disposal and flushing chemical lines prior to shutdown and/or cutting into chemical pipelines.

C. Continuous Treatment Provision:

1. The JH Wilson Water Treatment Plant is the largest water treatment plant for Central Arkansas Water and is critical for providing safe drinking water to its customers. The plant shall remain in operation and meet all permit requirements during construction Work with limited number of treatment units and support facilities out of service to allow to meet water demands.
2. Contractor shall provide labor, equipment, materials, and incidentals to provide continuous treatment to the level prior to construction Work.
3. Contractor shall be responsible for providing temporary pumping facilities, chemical feed systems, piping, valve, appurtenances, equipment, materials, and temporary utilities necessary to complete the Work to enable plant to meet water demands.

D. Related Sections:

1. Section 01 11 00 – Summary of Work
2. Section 01 25 00 – Substitution Procedures
3. Section 01 73 00 – Demolition and Execution of Work

1.02 REFERENCES

- A. Definitions: A "shutdown" is when a portion of the normal operation of Owner's facility, whether equipment, systems, piping, or conduit, has to be temporarily suspended or taken out of service to perform the Work.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Review installation procedures under other Specification sections and coordinate Work that must be performed with or before the Work specified in this Section.

2. Notify other contractors in advance of Work requiring coordination with Owner's operations, to provide other contractors sufficient time for work included in their contracts that must be installed with or before Work specified in this Section.
 3. When possible, combine multiple tie-ins into a single shutdown to minimize impacts on Owner's operations and processes.
- B. Pre-Shutdown Meetings: Contractor shall schedule and conduct meeting with Owner and Engineer prior to scheduling shutdown
- C. Sequencing:
1. Perform the Work in the specified sequence. Certain phases or stages of the Work may require working 24-hour days or work during hours outside of regular working hours. Work may be accelerated from a later stage to an earlier stage if Owner's operations are not adversely affected by proposed sequence change, with Engineer's acceptance. Stages specified in this Section are sequential in performance of the Work.
- D. Scheduling:
1. Work that may interrupt normal operations shall be accomplished at times convenient to Owner.
 2. Furnish at the Site, in close proximity to the shutdown and tie-in work areas, tools, equipment, spare parts and materials, both temporary and permanent, necessary to successfully complete the shutdown. Complete to the extent possible, prefabrication of piping and other assemblies prior to the associated shutdown. Demonstrate to Engineer's satisfaction that Contractor has complied with these requirements before commencing the shutdown.
 3. If Contractor's operations cause an unscheduled interruption of Owner's operations, immediately re-establish satisfactory operation for Owner.
 4. Unscheduled shutdowns or interruptions of continued safe and satisfactory operation of Owner's facilities that result in fines or penalties by authorities having jurisdiction shall be paid solely by Contractor if, in Engineer's opinion, Contractor did not conform to the requirements of the Contract Documents, or was negligent in the Work, or did not exercise proper precautions in conducting the Work.
 5. Work requiring service interruptions for tie-ins shall be performed during scheduled shutdowns.
 6. Temporary, short-term shutdowns of smaller piping, conduits, equipment, and systems may be required. Coordinate requirements for such shutdowns with Engineer and Owner.

1.04 SUBMITTALS

A. Action/Informational Submittals:

1. **Substitute Sequence Submittal:** When deviation from specified sequence is proposed, provide submittal explaining in detail the proposed sequence change and its effects, including evidence that Owner's operations will not be adversely affected by proposed change. List benefits of proposed sequence change, including benefits to Progress Schedule. Submit in accordance with Section 01 25 00 – Substitution Procedures.
2. **Shutdown Planning Submittal:**
 - a. For each shutdown, submit an inventory of labor and materials required to perform the shutdown and tie-in tasks, an estimate of time required to accomplish the complete shutdown including time for Owner to take down and start up existing equipment, systems, or conduits, and written description of steps required to complete the Work associated with the shutdown.
 - b. Furnish submittal to Engineer at least thirty (30) days prior to proposed shutdown start date. Do not start shutdown until obtaining Engineer's acceptance of shutdown planning submittal.
3. **Shutdown Notification:** After acceptance of shutdown planning submittal and prior to starting the shutdown, provide written notification to Owner and Engineer of date and time each shutdown is to start. Provide notification at least 72 hours in advance of each shutdown.

1.05 SITE CONDITIONS

- A. **General Constraints:** Specified in the Contract Documents are the sequence and shutdown durations, where applicable, for Owner's equipment, systems, and conduits that are to be taken out of service temporarily for the Work. New equipment, materials, and systems may be used by Owner after the specified field quality controls and testing are successfully completed and the materials or equipment are Substantially Complete.
- B. The following constraints apply to coordination with Owner's operations:
 1. **Operational Access:** Owner's personnel shall have access to equipment and areas that remain in operation.
 2. **Schedule and perform equipment and system start-ups** for Monday through Thursday. Equipment and systems shall not be placed into operation on Friday, Saturday, and Sunday without prior approval of Owner.

3. Dead End Valves or Pipe: Provide blind flanges, watertight bulkheads, or valves at temporary and permanent terminuses of pipes and conduits. Blind flanges and bulkheads shall be suitable for the service and braced and blocked, as required, or otherwise restrained as directed by Engineer. Temporary valves shall be suitable for their associated service. Where valve is provided at permanent terminus of pipe or conduit, also provide on downstream side of valve a blind flange with drain/flushing connection.
4. Owner will assist Contractor in dewatering process tanks, basins, conduits, and other work areas to be dewatered for shutdowns. Maintain clean and dry work area by pumping and properly disposing of fluid that accumulates in work areas.
5. Draining and Cleaning of Conduits, Tanks, and Basins: Unless otherwise specified, Owner will dewater process tanks and basins at beginning of each shutdown. Owner will flush and wash down tanks and basins with plant water. Draining and cleaning conducted by Contractor shall be as specified below:
 - a. Contractor shall remove liquids and solids during the Work and dispose of them at appropriate location at the Site as directed by the Owner. Contents of pipes, tanks, basins, and conduits undergoing modifications shall be transferred to existing process tanks or conduits at the Site with capacity sufficient to accept such discharges, using hoses, piping, pumps, or other means provided by Contractor. Discharge of fluids across floors is not allowed.
 - b. If drainage point is not available on the piping or conduit to be drained, provide a wet tap using tapping saddle and valve or other method approved by Engineer. Uncontrolled spillage of pipe's or conduit's contents is not allowed.
 - c. Spillage shall be brought to Owner's attention immediately, both verbally and in writing, and reported in accordance with Laws and Regulations. Contractor shall wash down spillage to floor drains or sumps and flush the system to prevent clogging and odors. If spillage is not suitable for discharge to the drainage system, such as chemical spills, as determined by Engineer, Contractor shall remove spillage by other method, such as vactor truck, acceptable to Engineer.
6. Electrical, Control, Communication, and Monitoring Systems:
 - a. Owner's existing SCADA system and fiber optic network shall remain functional, subject to the constraints herein.
 - b. Unless Contractor elects to use existing fiber and/or temporary fiber, at his/her discretion, at least one communication path through the new dual

redundant fiber optic ring to all communication points shall be in place at all times until substantial completion.

- c. Each process area shall be permitted to have a single, non-concurrent, scheduled outage for the purpose of making PLC panel hardware modifications, loading the associated PLC logic, and its field testing/demonstration. Field testing and demonstration shall immediately follow modifications in an effort to keep scheduled shutdowns as short as possible. A 14-day day period of no SCADA outage shall proceed each scheduled shutdown.
- d. Uninterrupted power to all facilities shall be maintained apart from during scheduled outages for tie-ins. Provide temporary power as necessary for any scheduled shutdowns extending beyond 4 hours unless approved otherwise by the Engineer and/or Owner.

1.06 WORK SEQUENCE CONSTRAINTS

- A. Perform the Work in the accordance with the following constraints on the work sequence. Shutdowns, constraints, procedures, and durations shall be in accordance with Table 01 14 00-1 of this Section. Work requiring service interruptions for tie-ins shall be performed during scheduled shutdowns. If deviances outside of these constraints are identified within the schedule and where applicable, Contractor to submit to Engineer 30-days prior to any changes to the sequence.

1. 72" Raw Water Pipelines:

- a. Prior to starting the work, requires completion of the following:
 - 1) Installation and operation of the 48" valve on the 48" main from Lake Maumelle.
- b. Only one of the northern raw water lines (existing 48" and existing 72") shall be out of service at a time.
 - 1) The raw water line shall only be out of service during active installation of the new raw water line. Contractor shall not be allowed to keep raw water line out of service for extended period of time when there is no active work on the new raw water pipeline. Provide temporary bulk heads, caps, tie-ins as required.

2. 12" Gravity Sludge Pipeline:

- 1) Must be completed or provide temporary tie-in to bring new basin modifications into operation

3. 30" Backwash Waste Pipeline:

- a. Requires completion of the following before initiating start-up:
 - 1) Waste Pit PS
 - 2) Backwash Treatment Tank
 - 3) 24" Backwash Return pipeline
 - 4) Rapid-Mix
- 4. 24" Backwash Return Pipeline
 - a. Requires completion of the following before initiating start-up:
 - 1) Waste Pit PS
 - 2) 30" Backwash Waste Pipeline
 - 3) Backwash Treatment Tank
 - 4) Rapid-Mix
- 5. Rapid-Mix Piping Tie-in:
 - a. Requires completion of the following before initiating start-up:
 - 1) Rapid-Mix Structure
- 6. Rapid-Mix (Area 20):
 - a. Prior to starting the work, requires completion of the following:
 - 1) Install 48" BI tie-in with temporary plug to Basins 2 and 3 Flow Split Box.
 - 2) Flocculation-Sedimentation Basin upgrades to Basins 2 through 4
 - b. Requires completion of the following before initiating start-up:
 - 1) Bulk Chemical Building and all ancillary systems
 - 2) Flocculation-Sedimentation Basins 2 and 3 48" Basin Influent Piping
 - 3) 72" Raw water pipelines
 - 4) Inlet to Basin 4 upsized to 48"
- 7. Flocculation-Sedimentation Basins:

- a. The first existing basin modification shall be completed in halves to maintain plant capacity needs. Shutdowns and seasonal constraints required to isolate basin halves are provided in Table 01 14 00.
- b. Contractor shall install stop logs in existing frames and/or install temporary bulk heads as needed when taking a sedimentation basin out of service to keep all filters in service.
- c. Having a full sedimentation basin out of service shall only occur between October 1 and June 30 until one full basin has been upgraded.
- d. Following the complete work of one of the existing basins (conversion to two isolated basins), one full basin may be taken out of service.
- e. The following a general sequence of work for the Flocculation-Sedimentation Basins:
 - 1) Basin 4 taken out of service. See shutdown requirements in Table 01 14 00. Perform the following:
 - a) Isolate Basin 4A and 4B using temporary bulk heads.
 - b) Install new 48" inlet piping and valve and replace 36" inlet valve to Basin 3. See additional shutdown required in Table 01 14 00.
 - c) Bring Basin 4A and Basin 4 rapid mix back online.
 - 2) Perform work in Basin 4B.
 - 3) Take Basin 4A offline to remove temporary bulk heads and install permanent gates. See shutdown requirements in Table 01 14 00.
 - 4) Bring Basin 4B online keeping Basin 4 rapid mix in service after gates are installed.
 - 5) Basin 3 taken out of service for improvements. See shutdown requirements in Table 01 14 00. Bring Basin 3A and 3B back online with existing Basin 3 rapid mix.
 - 6) Basin 2 taken out of service for improvements. See shutdown requirements in Table 01 14 00. Bring Basin 2A and 2B back online with existing Basin 2 rapid mix.
 - a) Replace 36" inlet valve during basin shutdown. See shutdown requirements in Table 01 14 00 for valve replacement.

- 7) Basin 1 taken out of service for improvements. See shutdown requirements in Table 01 14 00. Bring new Rapid Mix, Basin 1A and 1B online. New rapid mix to service all online basins by removing plugs in 48" BI to Basins 2 and 3, and turning off rapid mix chemical feed and mixers in Basins 2, 3 and 4.
 - a) See Rapid Mix requirements above.
 - 8) Basin 2 taken out of service for Basin Flow Split Box improvements and brought back online. See shutdown requirements in Table 01 14 00.
 - 9) Basin 3 taken out of service for Basin Flow Split Box improvements and brought back online. See shutdown requirements in Table 01 14 00.
 - 10) Basin 4 taken out of service for Basin Flow Split Box improvements and brought back online. See shutdown requirements in Table 01 14 00.
- f. Basin 4:
- 1) Requires completion of the following before initiating start-up:
 - a) 12" gravity sludge pipeline (temporary or permanent) to existing or proposed manholes
 - b) Electrical Building No. 2
- g. Basin 3:
- 1) Requires completion of the following before initiating start-up:
 - a) Connect 48" BI to Basin Flow Split Box and install temporary plug in 48" BI.
 - b) 12" gravity sludge pipeline
 - c) Electrical Building No. 2
- h. Basin 2:
- 1) Requires completion of the following before initiating start-up:
 - a) Connect 48" BI to Basin Flow Split Box and install temporary plug in 48" BI.
 - b) 12" gravity sludge pipeline

- c) Electrical Building No. 1, Basin 2 related improvements
 - i. Basin 1:
 - 1) Prior to starting the work, requires completion of the following:
 - a) Basins 2 (2A, 2B), 3 (3A, 3B), and 4 (4A, 4B)
 - b) Electrical Building No. 2
 - c) Install temporary sodium hypochlorite piping to maintain feed to existing basins 2, 3 and 4. Temporary piping must be operational at all times between September 1 and October 31.
 - 2) Requires completion of the following before initiating start-up:
 - a) 12" gravity sludge pipeline
 - b) Electrical Building No. 1, Basin 1 related improvements
 - c) See additional requirements in Rapid Mix section above.
- 8. Filters:
 - a. Four filters can be offline at any given time of the year
 - 1) For replacement of filter influent valves, Contractor shall install stop logs in existing frames and/or install temporary bulk heads as needed in the settled water channel to isolate filters. The stop logs/temp bulkheads shall be installed as not to isolate Sedimentation Basin 1 or 4 from the rest of the filters, unless that Sedimentation Basin is also out of service.
 - b. Filter valve actuator power supply from second floor filter building Electrical Room. Temporary power may be required if the architectural improvements in the filter building are not complete
 - c. Requires completion of the following before initiating start-up:
 - 1) Associated filter piping and valve improvements
 - 2) PLC and control improvements
 - a) The first four completed filters shall be controlled from the new individual PLCs and Master PLC, which will be a temporary system. The existing system will continue to feed the other 12 filters.

- b) Following completion of four additional filters, the finished eight filters shall be controlled from the new individual PLCs and Master PLC.
- c) Following completion of the third set of four filters (12 total), all filters shall be controlled from the new individual PLCs and new Master PLC. The remaining four filters will operate on the existing system until modifications begin.

9. Air Scour Blower

- a. No sequence constraints. Refer to Shutdown Schedule Table 01 14 00 for any shutdown constraints .

10. Backwash Supply Pump

- a. No sequence constraints. Refer to Shutdown Schedule Table 01 14 00 for any shutdown constraints.

11. Analyzer Room & Sample Lines

- a. All samples critical for process control or compliance (Raw water, CFE, CCB and finished water) must be monitored continuously by temporary analyzers or available at a minimum of one sample sink.
- b. All existing sample lines and analyzers are to remain in operation during the completion of filter gallery improvements, including finished chamber chemical injection piping improvements.

12. Bulk Chemical Building

- a. Maintain and keep in operation all existing chemical feed systems prior to initiating start-up for Alum, Lime, and phosphate feed.
- b. Requires completion of the following before initiating start-up:
 - 1) Yard chemical piping and injection locations for alum, lime and ZOP
 - 2) Filter building finished chamber chemical injection for lime
 - 3) Rapid-Mix Structure for alum and lime
 - 4) Finished Water Chemical Feed Room for ZOP

13. Finished Water Chemical Feed Room

- a. Requires completion of the following before initiating start-up:

- 1) Fluoride Containment and Tanks for Fluoride Feed Room
- 2) Bulk Chemical Building for ZOP Feed Room
- 3) Chemical yard piping from bulk storage areas
- 4) Filter building finished chamber chemical injection

14. Fluoride Containment and Tanks

- a. One bulk tank and transfer pump must be operational at all times.

15. Sodium Hypochlorite Upgrades

- a. Sodium hypochlorite feed to rapid mix basins shall be operational between September 1 and October 31.
- b. Sodium hypochlorite feed to finished water chamber injection locations **to be in operation at all times**. No exceptions.
- c. Work in the Sodium Hypochlorite Building has the following proposed sequence:
 - 1) Install new sodium hypochlorite solution (SHS) piping to finished water chambers and connect to rotameters 1 through 4 in south pump area. Existing SHS lines to remain in service.
 - 2) Replace ball valves on sodium hypochlorite (SH) metering pumps (PMP- 6021 through 6025) and new suction piping for PMP-6026. See Shutdown in Table 01 14 00 and after south SH storage tank is isolated and removed from service.
 - 3) Replace south SH metering pumps (PMP- 6021 through 6025), install new SH metering pump (PMP-6026), and install plant water supply and rotameters 5.
 - a) Work to be completed between November 1 and August 31.
 - 4) Bring south SH storage tanks back online and startup south SH metering pumps.
 - 5) Make north area 2" and 4" plant water and tepid water connections and relocated eyewash station. For 2" plant water and tepid water shutdown, see Table 01 14 00.
 - 6) Isolate north SH storage tanks, demolish piping and pumps in north area and construct SH dilution system and SH transfer pumps.

- 7) Connect new SH transfer pump (PMP-6017) to transfer pipeline to Chlorine Dioxide Building. See Table 01 14 00 for SH transfer pipeline shutdown. Demolish existing transfer pump and pad after connection.
- 8) Bring north SH storage tanks back online.
- 9) Connect SH fill line to dilution tank. See Shutdown in Table 01 14 00.
- 10) Perform startup on dilution system.

16. Backwash Treatment Tank

- a. Requires completion of the following before initiating start-up:
 - 1) Waste Pit PS
 - 2) 30" Backwash Waste pipeline
 - 3) 24" Backwash Return pipeline
 - 4) Rapid-Mix
 - 5) Bulk Chemical Building power distribution

17. Waste Pit PS

- a. Requires completion of the following before initiating start-up:
 - 1) 30" Backwash Waste pipeline
 - 2) Backwash Treatment Tank
 - 3) 24" Backwash Return pipeline
 - 4) Rapid-Mix
 - 5) Electrical Building No. 1 Modifications

18. Sludge Pump Station

- a. Requires completion of the following before initiating start-up:
 - 1) 6" sludge drain line and connection to new sludge system

19. Clearwell Baffling

- a. No sequence constraints. Refer to Shutdown Schedule Table 01 14 00 for any shutdown constraints.

- 20. Electrical Building No. 1 Modifications:
 - a. Prior to starting the work, requires completion of the following:
 - 1) Electrical Building No. 2
- 21. Electrical Building No. 2:
 - a. Requires completion of the following before initiating start-up:
 - 1) Temporary feed from DC2B and DC3B prior to Electrical Building No. 1 upgrades
- 22. Architectural Improvements
 - a. Admin Building and Lab Improvements:
 - 1) Argon delivery is anticipated every 4 months and is required for lab operation. Relocation of this tank is shown on the drawings.
 - 2) Requires temporary relocation of lab work to Ozark, which must be done prior to starting the laboratory work. Lab relocation by Owner.
 - 3) All samples critical for process control or compliance (Raw water, CFE, CCB and finished water) must be monitored continuously by temporary analyzers or available at a minimum of one sample sink.
 - b. Filter Gallery Improvements:
 - 1) No sequence constraints.
 - c. Cross Gallery Improvements:
 - 1) Prior to starting the work, requires completion of the following:
 - a) Bulk Chemical Building
 - b) Fluoride Containment and Tanks
 - c) Finished Water Chemical Feed Room
 - d) Demolition of existing chemical feed systems (alum, lime, phosphate, and fluoride)
 - d. Break Room and Control Room Improvements:
 - 1) Prior to starting the work, requires completion of the following:

- a) Temporary control room, which will become the permanent SCADA and PLC room

1.07 SHUTDOWNS

A. General:

1. Work that may interrupt normal operations shall be accomplished at times convenient to Owner.
2. Furnish at the Site, in close proximity to the shutdown and tie-in work areas, tools, equipment, spare parts and materials, both temporary and permanent, necessary to successfully complete the shutdown. Complete to the extent possible, prefabrication of piping and other assemblies prior to the associated shutdown. Demonstrate to Engineer's satisfaction that Contractor has complied with these requirements before commencing the shutdown.
3. If Contractor's operations cause an unscheduled interruption of Owner's operations, immediately re-establish satisfactory operation for Owner.
4. Unscheduled shutdowns or interruptions of continued safe and satisfactory operation of Owner's facilities that result in fines or penalties by authorities having jurisdiction shall be paid solely by Contractor if, in Engineer's opinion, Contractor did not conform to the requirements of the Contract Documents, or was negligent in the Work, or did not exercise proper precautions in conducting the Work.
5. Shutdowns shall be in accordance with Table 01 14 00 of this Section. Work requiring service interruptions for tie-ins shall be performed during scheduled shutdowns.
6. Temporary, short-term shutdowns of smaller piping, conduits, equipment, and systems may not be included in Table 01 14 00. Coordinate requirements for such shutdowns with Engineer and Owner.

B. Treatment Process Shutdown and Site Access Constraints:

1. Unit processes and equipment required for operation during each phase of the work shall be in accordance with Table 01 14 00.
2. Owner shall have roadway access to maintain access for chemical delivery at all times during the construction process

C. Shutdowns of Electrical Systems: Comply with Laws and Regulations, including the National Electric Code. Contractor shall lock out and tag circuit breakers and switches operated by Owner and shall verify that affected cables and wires are de-energized to ground potential before shutdown Work is started. Upon completion of shutdown Work, remove the locks and tags and notify Engineer that facilities are available for use.

D. Shutdowns of Communications, SCADA, and Networking:

1. Process areas that are controlled by the PLCs in the existing control room will be controlled by new PLC (CP-WIL-SR) in the SCADA room. All process equipment in these areas which are controlled remotely by the existing PLC (WILPR) shall be placed in local-manual mode until the new PLC is installed and commissioned. These areas, per existing PLC I/O point list, include the following:

Valve #19 Controls
Valve 20 #1 Open/Closed Position
Valve #28 Controls
Valve #66 Controls
Intermediate North Loop Valve #67
Intermediate North Loop Valve #246
Intermediate Pulaski Heights Bypass Valve Controls
Influent Valve #1 Controls and Line Flow
Influent Valve #2 Controls and Line Flow
Influent Valve #3 Controls and Line Flow
Maumelle Valve Controls, Maumelle Line Pressure
Wash Tank Emergency Fill Valve

2. Existing fiber optic cabling are routed in star configuration which will be replaced by a fiber optic loop. New network cabinets with fiber optic patch panels and managed Ethernet switch(es) shall be installed first, existing PLCs shall be connected to the new network cabinet before disconnecting from the old fiber optic patch panels to avoid SCADA outage in the respective process area.
3. Existing PLCs in each filter console will be replaced with a new PLC. Filter shutdown is needed for this upgrade and shall be done in sequence and fully coordinated with the Owner.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 GENERAL

- A. In addition to requirements of this Section, conform to requirements of Section 01 73 00 – Demolition and Execution of Work.
- B. Refer to Table 01 14 00 in this Section for:
 1. Schedule of process equipment and service lines out-of-service during shutdown.

2. Schedule of process equipment in operation during shutdown.
3. Other process areas impacted during shutdown
4. Proposed procedure to support shutdown.
5. Tie-ins required during each shutdown.
6. Isolation required during each shutdown
7. Duration of each shutdown.
8. Additional constraints and remarks for each shutdown

3.02 DETAILED SHUTDOWN REQUIREMENTS:

A. Prior to Typical Shutdown:

1. Obtain Engineer's acceptance of proposed shutdown planning submittal and shutdown notification submittal.
2. Submittal and approval of all shop drawings required.
3. Coordinate with plant operations on timing of shutdown and provide required notice to Owner.
4. Bring necessary piping, couplings, valves, equipment, and appurtenances to the work areas.
5. Assist Owner in preparing to take equipment, tanks, basins, and conduits temporarily out of service.
6. Owner shall be responsible for operation of all valves to support start up
7. Coordinate other tie-ins to be performed simultaneously.
8. Install and ensure functionality of temporary systems as applicable.

B. During Typical Shutdown:

1. Owner will dewater tanks and basins.
2. Remove existing equipment, piping, and accessories as required.
3. Verify operation of new equipment, materials, and systems.
4. Following approval from Engineer, return equipment and system to operation with Owner.

C. Following Typical Shutdown:

1. Verify functionality of equipment and system.
2. Verify operation of new equipment and systems, and verify that joints in piping are watertight or gastight as applicable.
3. Repair joints that are not watertight or gastight as applicable.
4. Remove temporary systems as applicable.
5. Assist Owner in preparing to bring equipment, tanks, basins, and conduits back into service.
6. Owner shall be responsible for operation of all valves to support start up.

**Table 01 14 00-
Schedule of Shutdowns**

Process Area	Shutdown No.	Item Description	Process Equipment and Service Lines Out-of-Service During Shutdown	Process Equipment In Operation During Shutdown	Other Process Areas Impacts	Procedure	Constraints and Remarks	Maximum Duration
New Raw Water Meter Vault	1	Magnetic flow meters for existing raw water pipeline	Existing 72" raw water pipeline	Basins 3 & 4	Basin 1	Complete Basins 4 & 3 Construct Raw Water Meter Vault Divert Raw Water to Enter from East Install New Raw Water Pipelines Install Flow Meter	Completion of Basins 3 & 4	
	2	Magnetic flow meters for new 72" raw water pipeline	Existing 72" raw water pipeline, Tentative	Basins 3 & 4	Basin 1	Complete Basins 4 & 3 Construct Raw Water Meter Vault Divert Raw Water to Enter from East Install New Raw Water Pipelines Install Flow Meter	Completion of Basins 3 & 4 Contractor may stage work in a manner that the existing 72" RW remains in service during the installation of this meter.	
Raw Water Meter Vault No. 2	3	Demolish existing venturi meter and replace with a spool	Basins 3 and 4, 48" RW between Valves #23 and #27, Sed Basins 3 and 4	Basins 1 and 2	Flow Spit Box - Basin 3 & 4	Note: This work should occur during the isolation for Basin 3 & 4 Flow Split Box modifications • Close Valves #23 and #27 • Demolish venturi meter • Install new spool	This work must be performed prior to Basin 1 modifications.	
Flocculation-Sedimentation Basin 4A and 4B	4	Isolate Basins 4A and 4B	Basin 4 Basin 4 Settled Water Sample pump and turbidimeter	Basins 1, 2 and 3	Four associated filters, Floc stage 2 pH unit	• Isolate Basin 4 by closing new 48" influent BFV (new Valve #26) and close Basin 4 settled water channel gate. • Drain entire Basin 4 for initial work to provide Basin 4A/4B isolation capability • Once isolated, Basin 4B can be brought back online	Work to be completed separately from Floc-Sed Basin 4A to maintain plant capacity needs Basin 4 to be drained and isolated between November and June After isolation, only half the basin can be online at any given time until the full basin is completed	4 weeks to bring Basin 4B back online for isolation

Flow Split Box - Basin 3 & 4	5	1) Basin 4 - 48" RW Tie-In and 48" BFV Replacement 2) Basin 3 - 36" RW BFV Replacement	Basins 3 and 4, 48" RW between Valves #23 and #27, Sed Basins 3 and 4	Basins 1 and 2	Installation of new coagulated water sample point	Note: BFVs in Flow Split Boxes 3 and 4 should be replaced at the same time. • Close Valves #23 and #27 • If Jackson pumps are on, Valve #29 should be open; if Jackson pumps are off, Valve #29 should be closed • Add stop logs to close existing floc inlet openings (these should be verified beforehand to reliably isolate the RM box) • Drain pipe and existing RM box for Basin 3 • Remove existing 36" BFV (Valve #26) and 36" piping connecting to the 48" RW header in yard • Replace with 48" piping, BFV, and appurtenances • Replace 36" BFV (Valve #25) in-kind	Work to be performed during shutdown of Basin 4A and 4B and between November and March. Installation of the 48" influent pipe shall be completed prior to bringing on the Rapid-Mix and Flow Split Box	1 week
Flocculation-Sedimentation Basin 4A	6	Basin 4A Shutdown for Gate Installation	Basin 4	Basins 1, 2 and 3	Sludge Vault 4A and isolation of existing portion of sludge lines beneath sludge vaults. tie-into new sludge line.	• Isolate Basin 4 by closing new 48" influent BFV (new Valve #26) and closing Basin 4 settled water channel gate • Drain entire Basin 4A for installation of Flow Diversion Box and Settled Water Channel gates.	Basin 4B work must be completed and equipment started up to bring Basin 4B online after this shutdown. Basin 4 to be drained during October-June	4 weeks
Flocculation-Sedimentation Basin 3A and 3B	7	Basin 3 Shutdown	Basin 3 Basin 3 Settled Water Sample pump and turbidimeter	Basins 1, 2, 4	Sludge Vaults 3A/3B and isolation of existing portion of sludge lines beneath sludge vaults, tie-into new sludge line. Floc stage 2 pH unit	• Isolate Basin 3 by closing new influent BFV (new Valve #25) and closing Basin 3 settled water channel gate • Drain entire Basin 3		
Flocculation-Sedimentation Basin 2A and 2B	8	Basin 2 Shutdown	Basin 2 Basin 2 Settled Water Sample pump and turbidimeter	Basins 1, 3, 4	Sludge Vaults 2A/2B and isolation of existing portion of sludge lines beneath sludge vaults, tie-into new sludge line. Floc stage 2 pH unit	• Isolate Basin 2 by closing new influent BFV (new Valve #24) and Basin 2 settled water channel gate • Drain entire Basin 2		

Flow Split Box - Basin 2	9	Basin 2 - 36" RW BFV Replacement	Basin 2, 48" RW between Valves #21/Raw Water Meter Vault No. 1 and #23, Sed Basins 1 and 2	Basins 3 and 4	N/A	• Close Valve #19, #20, #21, #23 (need to confirm these are functional and can isolate as required for construction) • If Jackson pumps are on, Valve #29 should be open; if Jackson pumps are off, Valve #29 should be closed • Close gates between rapid mix and flocculation basins. • Drain pipe and existing RM box • Replace 36" BFV (Valve #24) in-kind	Work to be performed during lower flow conditions, e.g. between October and February, to avoid two basins down at peak flow conditions Work to occur during Basin 2 shutdown. Alternate valve and basin closure will be required in replaced after the new RM is online.	1 week
Flocculation-Sedimentation Basin 1A and 1B	10	Basin 1 Shutdown	Basin 1 Basin 1 Settled Water Sample pump and turbidimeter	Basins 2, 3, 4	Rapid Mix construction Floc stage 2 pH unit Sludge Vaults 1A/1B and existing portion of sludge lines beneath sludge vaults, tie-into new sludge line. Install raw water and coagulated water sample lines, sample pump enclosure.	• Isolate Basin by closing Valve #19, #20, #21, #23 (need to confirm these are functional and can isolate as required for construction) • If Jackson pumps are on, Valve #29 should be open; if Jackson pumps are off, Valve #29 should be closed • Drain entire Basin 1	Temporary sample for turbidity/pH needed at this point - existing raw and coagulated water sample lines offline. Sample point operation dependent on (a) completion of sample yard piping (b) sample panel and (c) completion of analyzer room and installation of new pipe gallery PEX lines.	
All Filters	11	Instrumentation	Relevant Filters based on sequencing	Relevant Filters based on sequencing	Backwash system, Air Scour Blower System, individual filter turbidimeters	New controllers for the first bank of filters will be temporary until final location is taken out of service and installed. The final four filters will operate with existing controllers as temporary system	Existing filters shall maintain automatic control at all times. If a control outage is required, it should be limited to one day (24 hours)	N/A
Filters	12	Removing Filter From Service (Typical for all filters)	Filter	Other Filters	N/A	Close the following valve (coordinate with Owner): 1 - Filter influent valve 2 - Filter effluent valve 3 - Backwash supply valve 4 - Backwash drain valve 5 - Air scour valve Drain filters		No maximum duration
Filters	13	42" FI Valve Replacement (Typical for all filters)	Filter and Settled Water Channel	Other Filters	N/A	Isolate filter influent channel using stop logs Drain channel Replace valve(s)	Cannot isolate both north and south settled water channels at the same time unless the sedimentation basin feeding that channel is also out of service. May require isolating two filters at a time.	No maximum duration

Filters	14	36" BWW Valve and Piping Replacement and 30" FTW Valve Installation (Typical for all filters)	Filter	Other Filters	N/A	1 - Coordinate with plant for period when no backwashes will be occurring. 2 - Demolish BWW piping 3 - Install temporary plug in drain piping to prevent washwater from backflowing out of cut pipe. 4 - Install flange on BWW pipe 5 - Coordinate with plant for period when no backwashes will be occurring. 6 - Remove plug and install piping and valve	Not during backwash. Coordinate with OWNER to ensure timing does not coincide with backwashing. If all the work can be performed between backwashes, installation of a plug may not be required.	24 hours (with no plug or pipe connection to BWW)
Filters	15	20" FLW Valve Installation (Typical for all filters)	Either entire bank of East Filters (Filters 9-16) and East Finished Chamber or entire bank of West Filters (Filters 1-8) and West Finished Chamber	Other bank of filters and other finished chamber	Chemical Feed to Finished Water Chamber that is out of service	Isolate East or West Gallery: 1. Close both 42" Filtered Water Valves (237 and 238) to isolate East and West Filters 2. Close one 14" Filtered Water Valves (235 or 236) to isolate backwash fill tank pump suction. 3. Close all filter effluent valves in bank of filters being taken out of service. 4. Close 96" Yard Valves (217 for West Filter Bank out of service and 219 & 220 for East Filter Bank out of service) 5. Dewater pipe as necessary for valve replacement. 6. Install 20" FLW effluent valves 7. Return pipe to service by	Work to be performed between October and May, during low flow periods Not during backwashes. Not during backwashes. Coordinate with OWNER to ensure timing does not coincide with backwashing. Coordinate with plant to transfer all post filter chemical feed to finished chamber that is to remain in service prior to shutdown.	36 hours
Filters	16	36" Filter Backwash Valve (Typical for all filters)	Either entire bank of East Filters (Filters 9-16) or entire bank of West Filters (Filters 1-8)	Other bank of filters	None	Isolate Backwash Header: 1. Close 36" BW header valve to isolate either East or West Filter Backwash Header. For East Filters, also close Cla-Val valve in vault to the east of filter building. 2. Dewater 36" BW header 3. Install valves 4. Fill Backwash Header ensure removing all air from header. 5. Open 36" BW header valve	Cannot backwash bank of filters Provide ventilation for draining and filling. Backwash header to be placed in service only when pipe is pressurized and no air remain	36 hours

Backwash Header Valves	17	36" Backwash Header Valves Replacement	Backwash System	N/A	N/A	Isolate Backwash Header: 1. Close BW flow control valve and Cla-Val valve in vault east of filters. 2. Close all filter BW valves 3. Dewater BW header 4. Replace each and west header valves 5. Refile header by slowly opening BW flow control valve and remove all air from header.	Work to be performed between October and May, during low flow periods Provide ventilation for draining and filling. Backwash header to be placed in service only when pipe is pressurized and no air remaining.	40 hours
Backwash Supply Pump Isolation Valve and Tie-In Piping	18	12" Backwash Pump Isolation Valve and Tie-In Piping	Backwash System	N/A	N/A	Isolate Backwash Header: 1. Empty wash water tanks (coordinate with owner) 2. Close BW flow control valve 3. Close Wash Tank #1 and #2 isolation valves (71, 72, and 73) 4. Close both 14" filtered water valves (235 and 236) 5. Dewater header 6. Install valve	No backwashing or filling of wash tanks	40 hours
Backwash Supply Pump, Elbow and Check Valve	19	Backwash Supply Vertical Turbine Pump, Elbow and 14" Check Valve	Backwash supply pump	N/A	N/A	Isolate Backwash Supply Header: 1. Close backwash supply pump isolation valve 2. Close both 14" filtered water valves (235 and 236) 3. Install pump, elbow, and check valve	Backwash supply pump isolation valve and tie-in piping must be installed prior to this work High service pump station to be used for wash tank filling	No maximum duration
East and West 14" BW Supply Pump Suction Valve East 30" Mixer Blind Flange Installation	20	14" BW Supply Pump Suction Valves	Backwash supply pump Filters 9 through 16	Filters 1 through 8	N/A	Isolate and Dewater East Gallery 60" Filtered Water Piping: 1. Isolate west 14" header from 60" FLW header upstream of west 14" filtered water valve (235) 3. Close 96" Yard Valves (218 and 219) 4. Dewater 60" FLW piping via east finished chamber 5. Install valves 6. Remove existing mixer and install 30" mixer blind flange	Isolation of of flow can be completed via installation of insertion valve This shut down may occur at the same time as the 20" FLW effluent valve installation. Dewatering pump, valves, and flanges shall be disinfected per 40 05 00. Provide ventilation for draining and filling. Backwash header to be placed in service only when pipe is pressurized and no air remaining. High service pump station to be used for wash tank filling.	36 hours

West 30" Mixer Blind Flange Installation	21	West Mixer Blind Flange Installation	Backwash supply pump Filters 1 through 8	Filters 9 through 16	N/A	Isolate and Dewater West Gallery 60" Filtered Water Piping: 1. Close both 42" Filtered Water Valves (237 and 238) 2. Close 96" Yard Valve (217) 3. Dewater 60" FLW piping via west finished chamber 4. Remove existing mixer and install 30" mixer blind flange	This shut down may occur at the same time as the 20" FLW effluent valve installation. Dewatering pump, valves, and flanges shall be disinfected per 40 05 00. Provide ventilation for draining and filling. Backwash header to be placed in service only when pipe is pressurized and no air remaining. High service pump station to be used for wash tank filling.	36 hours
East Filter Influent Channel Hydrostatic Level Sensor	22	East Gallery Level Sensor	Filters 13 through 16 Sedimentation Basin 4	Filters 9 through 16	N/A	1. Isolate filter influent channel using stop logs 2. Dewater filter influent channel 3. Install level sensor	Any time except July through September (Basin 4 OOS - no halves in service) Existing bubbler level sensor to remain in service until installation of new level sensor.	No maximum duration
West Filter Influent Channel Hydrostatic Level Sensor	23	West Gallery Level Sensor	Filters 1 through 4	Filters 5 through 16	Sedimentation Basin 2	1. Isolate filter influent channel using stop logs 2. Dewater filter influent channel 3. Install level sensor	If no prior Basins have been completed and brought into service, this work can only be performed any time except July through September If another Basin has been completed and brought into service, four filters can be taken out of service any time of the year Existing bubbler level sensor to remain in service until installation of new level sensor.	No maximum duration
Cross-Gallery Filter Influent Channel Hydrostatic Level Sensor	24	Cross Gallery Level Sensor	Filters 9 through 12	Filters 1 through 8 & Filters 13 through 16	Sedimentation Basin 3	1. Isolate filter influent channel using stop logs 2. Dewater filter influent channel 3. Install level sensor	If no prior Basins have been completed and brought into service, this work can only be performed any time except July through September. If another Basin has been completed and brought into service, four filters can be taken out of service any time of the year. Existing bubbler level sensor to remain in service until installation of new level sensor.	No maximum duration

Air Scour Building	25	Tie in of new blower (BLWR-3202)	Both blowers will be out of service while the new blower discharge is tied into the existing blind flange.	N/a	Filter air scour	1. Remove blind flange and connect new piping.	Do not operate blowers during tie-in No filter backwashes	24 hours
Waste Pit PS	26	New waste pit pump station to transport backwash flow to Backwash Treatment Tank	Backwash Treatment Tank	Existing Waste Pit Pumps	Backwash will be limited while the connection is made to the existing WPPS	Construct New WPPS Structure Install mechanical equipment & Class A Fill Install 36"-BWV to connection point Isolate existing WPPS Core wall into existing WPPS and install pipe connection Start-up new WPPS Pumps Demo Existing WPPS Pumps Install Class A fill in Existing WPPS	Connection to existing WPPS must be coordinated with Owner due to backwashing constraints.	40 hours
Sludge PS	27	New sludge pumps	Basin drain lines	N/a	Sedimentation Basins	Isolate sludge pump station by closing all basin drain valves	No constraints or remarks	No maximum duration
Sodium Hypochlorite (SH)	28	Replacement of suction ball valves on south pumping areas (PMP 6021 through PMP 6025) and new suction connection for PMP 6026.	Existing Basin Feed Pumps Sodium Hypochlorite Tank 6011 Sodium Hypochlorite Tank 6012	Existing Finished Chamber Feed Pumps in North Pump Building Area. Existing Chlorine Dioxide Transfer Pump in South Pump Building Area Sodium Hypochlorite Tank 6013 Sodium Hypochlorite Tank 6014	N/A	Isolate feed pump suction header ball valves (two) to isolate South Feed Pump Building Area from North Feed Pump Building Area Isolate discharge suction valve at Tanks 6011 & 6012. Replace each pump suction Ball Valves Install new Pump 6026 Pump suction valve and piping and Rotameter 5 Piping	Existing piping to filter building and injection from North Pump Building Area to remain in service Any time except September through November	4 hours
Sodium Hypochlorite (SH)	29	North Pump Area plant water And tepid connections	2-inch PLW for washdown hose bibbs TW for eyewash shower stations	South Area PMP Tank 6011 to 6014 Existing Chlorine Dioxide Transfer Pump	N/A	Connect tee and isolation valve for plant water to Valve 6003 in North Pump Building Area. Isolate 2-inch PLW and TW, install tee and isolation valves. Reopen 2-inch PLW and TW lines.	N/A	4 hours
Sodium Hypochlorite (SH)	31	SH transfer pipeline shutdown	Chlorine Dioxide Transfer pump PMP 6001, 6002, tank 6000.	South Area PMP Tank 6011 to 6014	N/A	Connect piping from PMP 6017 to existing Chlorine dioxide transfer line. Demolition of old chlorine Dioxide transfer pump and pad in south pump area	Sodium Hypochlorite Day tank in Chlorine Dioxide Building to be full before making connection.	4 hours

Sodium Hypochlorite (SH)	32	Tank 6000 Connections	PMP 6001, 6002, tank 6000.	South Area PMP Tank 6011 to 6014	N/A	Isolate delivery connections on tanks 6011 to 6014 Connect delivery station to Tank 6000 and From Static mixer to Bulk storage Re open delivery connections on tanks 6011 to 6014	Ensure delivery of Sodium Hypochlorite has occurred no more than 2 days before this connection	4 hours.
Fluoride Containment 1	33	TK-6201, PMP-6201, PSH-6201	Tank 1 and associated pump	TK-6202, PMP-6202, Existing Fluoride Day Tank		Isolate fluoride containment 1 from the day tank transfer line. Drain lines and tank prior to demolition. Ensure that fluoride containment 2 tank and pumps are operational.	Fluoride containment 2 must be fully operational.	
Fluoride Containment 2	34	TK-6202, PMP-6202, PSH-6202	Tank 2 and associated pump	TK-6201, PMP-6201, Existing Fluoride Day Tank		Isolate fluoride containment 2 from the day tank transfer line. Drain lines and tank prior to demolition. Ensure that fluoride containment 1 tank and pumps are operational.	Fluoride containment 1 must be fully operational.	
Fluoride Bulk Transfer Piping	35	Fluoride bulk transfer piping	Fluoride system	N/A	N/A	Disconnect transfer pump discharge piping from existing transfer line and connect to new transfer line	Finished water chemicals room and associated feed lines must be constructed prior to this work.	3 days
Bulk Chemical Building	36	Bulk Chemical Building	N/A	Existing Alum, Lime, and Phosphate Chemical Systems	N/A	N/A	Finished water chemicals room and new rapid mix structure must be constructed prior to bulk chemical building.	N/A
Clearwell No. 1	37	Install FRP baffles in Clearwell No. 1	Clearwell No. 1	Chlorine Contact Basin and Clearwell No. 2	N/A	Isolate Clearwell No. 1 by closing 48" butterfly valves (52, 53, and 62) Drain Clearwell No. 1 Install Baffles Disinfect Clearwell No. 1 Return Clearwell No. 1 to service	Clearwell No. 2 must be in service during this work Work must be performed between October & February	4 Months
48" Raw Water Valve	38	48" Valve Addition Near Vault 1, Sheet C1201	48" RW pipeline between Lake Maumelle & Valve 400	72" RW pipeline from Lake Maumelle 48" RW pipeline from Jackson Reservoir Basins 1 - 3	N/A	Close Valve 400 Coordinate with CAW to drain 48" RW to the degree possible through the WTP and by opening check valve at Maumelle Pump Station. Responsibility for draining the line remains with Contractor. Close Valve 75 Install and test new valve Return pipelines to service	This work must be performed prior to modifications of existing raw water line and Basin 1. This work must be completed before raw water flow is diverted to east plant entrance.	
Replacement of 48" Valve 27	39	48" Valve Replacement in Interstate Vault, Sheet C1202	48" RW from east to Raw Water Meter Vault No. 2	Basins 1 - 3	This shutdown could be combined with the shutdowns for Raw Water Meter Vault No. 2 and/or Flow Split Structure for Basins 3 & 4.	Close Valves 23, 28, & 29 (if functional). Replace Valve 27 Test and return pipelines to service	This work cannot be performed during the period of time that RW is scheduled to enter the plant through the east connection. Note that if Valve 29 will not function adequately, it may be best to replace valves 27 and 29 at the same time.	

Replacement of 48" Valve 29	40	48" Valve Replacement in Interstate Vault, Sheet C1202	48" RW from east to Raw Water Meter Vault No. 3 48" RW to Jackson Reservoir	Basins 1 - 3	This shutdown may best be combined with the shutdown for replacement of Valve 27.	Close Valves 28 & 27 Coordinate with CAW to close valve 357 at the Jackson Reservoir Replace Valve 29 Test and return pipelines to service	This work cannot be performed during the period of time that RW is scheduled to enter the plant through the east connection. Note that if Valve 27 will not function adequately, it may be best to replace valves 27 and 29 at the same time.	
New 72" Raw Water Line	41	Replacement of existing 48-inch raw water pipeline with 72-inch raw water pipeline	Existing 48" Raw Water pipeline	Raw water capacity must be maintained sufficient to the plant's demand which vary seasonally.	CIO2 to be kept in service at all times If flow is diverted through east 48"-RW, Basins 3 & 4 must be in service	Construct Raw Water Flow Meter Vault Install 48" valve on the 48" main from Lake Maumelle Isolate pipeline from connections to sedimentation basins Install 72" RW, including section of 60" RW and MFM Install sufficient length of 48" RW to provide isolation prior to start-up Extend chlorine dioxide feed to new point of connection on 48"-RW	Adequate raw water capacity must be maintained to provide plant demand. Coordinate closely with Owner.	
Extend Existing 72" Raw Water Line	42	Extend existing 72"-RW to connection point at Rapid Mix, including 60"-RW segment and MFM	Existing 72"-RW New Rapid Mix	Raw water capacity must be maintained sufficient to the plant's demand which vary seasonally.	CIO2 to be kept in service at all times If flow is diverted through east 48"-RW, Basins 3 & 4 must be in service	Construct Raw Water Flow Meter Vault Isolate existing 72"-RW with existing valve Isolate 72"-RW from connections to sedimentation basins Extend 72"-RW to new connection point at Rapid Mix, including section of 60" RW and MFM Extend chlorine dioxide feed to new point of connection on 72"-RW	Adequate raw water capacity must be maintained to provide plant demand. Coordinate closely with Owner.	
Electrical Building 1	43	Replace MCCs in Electrical Building 1	Basin 1 and Basin 2	Basin 3 and Basin 4	Waste Pit	Install MCC-EB1-1 and MCC-EB1-2 in open space in Electrical Building 1. Transition loads to remain from DC2 and DC3 to new MCC.	Electrical Building 2 complete	8 hours
Electrical Building 2	44	Permanent power to MCC-FLOC-3 and MCC-FLOC-4	Basin 3 and Basin 4	Basin 1 and Basin 2	None	Electrical Building 2 to be supplied temporarily from DC2B/DC3B in Filter Building until work in Electrical Building 1 is complete. Once Electrical Building 1 work is complete and conduits for permanent feeds to MCC-FLOC-3 and MCC-FLOC-4 are installed, temporary power shall be switched over to permanent	Temporarily supply from DC2B/DC3B until work in Electrical Building 1 is complete	8 hours

Pipe gallery sample lines	45	Routing of new sample lines and sequence of sample line installation to new analyzer room and admin building lab.	All demo'd sample pumps and sample lines as sequenced during construction.	Existing sample lines and analyzers remain in service until construction of the new analyzer room and sample panels are complete.	Installation of new sample pumps and yard piping (sludge vaults, raw water pump enclosure, CCB influent/effluent, finished water sample pumps) Finishing Chambers Analyzer Room Admin lab improvements Routing of sample and chemical pipes to crawl space HVAC units	1. Construct sample pipe panels A & B and complete new yard sample piping connections to pipe gallery. 2. Sample lines are to remain in operation during the completion of finished chamber chemical injection piping improvements. If sample lines must be taken out of service before the completion of the Admin Building analyzer room/day lab, samples critical for process control or compliance (Raw water, CFE, CCB) must be monitored continuously by analyzers or available at a minimum of one sample sink. Temporary analyzer locations or sample lines may be established to satisfy this requirement. Periods where samples are not accessible may not exceed 8 hrs.	Sample lines and analyzers are to remain in operation during the completion of finished chamber chemical injection piping improvements. All samples critical for process control or compliance (Raw water, CFE, CCB and finished water) must be monitored continuously by temporary analyzers or available at a minimum of one sample sink. CMAR to sequence construction ensuring that HVAC equipment remains in operation at all times.	Online CCB monitoring shall not be interrupted for a period exceeding four hours. Periods where raw water or CFE samples are not accessible either at a sink or monitored via analyzers may not exceed 8 hrs.
Analyzer Room	46	Upgrade of new analyzer room, and sequencing of connections to existing and new analyzers.	Upon completion of the new analyzer room/day lab, all sample lines are to be temporarily removed from service for demo & replace of sample lines.	All analyzers not impacted by rehabilitation of the analyzer room and replacement of sample lines (individual filter turbidimeters, flocculation pH analyzers)	Installation of new sample pumps and yard piping (sludge vaults, raw water pump enclosure, CCB influent/effluent, finished water sample pumps).	1. Construct sample pipe panels A & B and complete new yard sample piping connections to pipe gallery. 2. Sample lines are to remain in operation during the completion of finished chamber chemical injection piping improvements. If sample lines must be taken out of service before the completion of the Admin Building analyzer room/day lab, samples critical for process control or compliance (Raw water, CFE, CCB) must be monitored continuously by analyzers or available at a minimum of one sample sink. Temporary analyzer locations or sample lines may be established to satisfy this requirement. Periods where samples are not accessible may not exceed 8 hrs.	Sample lines and analyzers are to remain in operation during the completion of finished chamber chemical injection piping improvements. All samples critical for process control or compliance (Raw water, CFE, CCB and finished water) must be monitored continuously by temporary analyzers or available at a minimum of one sample sink. CMAR to sequence construction ensuring that HVAC equipment remains in operation at all times.	Periods where CCB, raw water or CFE samples are not accessible either at a sink or monitored via analyzers may not exceed 8 hrs.
Filter Gallery HVAC Improvements	47	Upgrade of HVAC equipment for filter 2nd floor cross gallery and control room	Control room or cross gallery HVAC equipment.	Control room or cross gallery HVAC equipment.	N/A	1.Demo carbon room and make it the new mech room. 2.Install new AHU-3001 and AHU-3002	Minimize HVAC downtime and provide cooling/heating for half the space	N/A

						3.Install ductwork for AHU-3002 and get it functional 4.Demo old MECH room and existing conditioning units. 5.Install AHU-3001 duct and get it functional.		
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SECTION 09 67 23
EPOXY FLOOR SYSTEM

PART 1 – GENERAL

1.01 THE REQUIREMENT

- A. Scope:
 - 1. Furnish all labor, materials, equipment, and incidentals required to furnish and install seamless Epoxy Floor Topping systems as shown and specified.
 - 2. Epoxy Floor Topping Work includes:
 - a. Surface preparation and installation of Epoxy Floor Topping.
 - b. Installation of Epoxy Floor Topping.
 - c. All clean-up following installation of the Epoxy Floor Topping.
- B. Coordination: Review installation procedures under other Sections and coordinate the installation of items that must be installed with the Epoxy Floor Topping systems.

1.02 QUALITY ASSURANCE

- A. Manufacturer's Instructions: In addition to specified requirements, strictly comply with resin Manufacturer's printed instructions and recommendations, including:
 - 1. Preparation of substrate.
 - 2. Storing.
 - 3. Mixing and applying materials.
 - 4. Curing of Epoxy Floor Topping Work.
- B. Installer's Qualifications:
 - 1. All Epoxy Floor Topping and coved base shall be applied only by a firm which:
 - a. Is a recognized installer of epoxy flooring systems and has at least five (5) years proven experience in the installation and repair of epoxy flooring, or similar type flooring systems.
 - b. Is approved and certified by the materials Manufacturer to install the product.
- C. System Coordination and Source:

1. In order to obtain a completely coordinated flooring system with compatible components, all materials shall be supplied and/or coordinated through the Manufacturer of the flooring resins.
 2. All components, and all installation methods and procedures shall be in strict conformance with the resin Manufacturer's written recommendations.
- D. Epoxy components shall not produce volatile organic compounds during installation and all air regulations shall be complied with during installation of work.

1.03 SUBMITTALS

A. Samples:

1. Submit 6-inch samples of accessories such as divider strips, edge strips, expansion strips, etc.
2. Provide flat samples, 36" x 36" minimum, of the full thickness flooring materials, with differing amounts of skid-resistance:
 - a. Provide a minimum of three such samples, installed on hardboard backing for District review, and selection of surface finish required.
3. Color samples.

B. Shop Drawings:

1. Submit Shop Drawings for layout and details of all stop and divider strips, expansion strips and base strips.

C. Manufacturer's Certificate:

1. Submit copies of manufacturer's written certification that all epoxy flooring system materials meet or exceed the properties specified herein.

D. Qualifications:

1. Submit installer qualifications including letter from manufacturer stating that the installer is certified and approved to install flooring. Provide letter showing a listing a minimum of five projects of similar scope and using the same materials and manufacturer proposed.
2. Submit detailed Plan of Operation for building ventilation and access restrictions prior to beginning Work in any new area or location.

PART 2 – PRODUCTS

2.01 SYSTEM

- A. The flooring system shall consist of the following:
 - 1. Concrete surface preparation and moisture testing in accordance with manufacturer's printed recommendations and installation instructions.
 - 2. Surface priming with a moisture tolerant primer with excellent wetting properties.
 - 3. An epoxy bodycoat with multi-colored flake to simulate terrazzo.
 - 4. Two topcoats as required to provide desired finish.
 - 5. Final cleaning.
- B. Finished Floor Physical Properties:
 - 1. Compressive Strength: 8,000 minimum PSI after 7 days.
 - 2. Flexural Strength: 2,400 PSI minimum.
 - 3. Tensile Strength: 1, 500 PSI minimum.
 - 4. Water Absorption: 0.20% maximum.
 - 5. Hardness (Shore D): 85-90.
 - 6. Nominal Finished Floor and Coved Base Thickness:
 - a. 3/32-inch minimum, unless indicated otherwise at specific areas. Provide additional coats as recommended by manufacturer to achieve desired thickness.
- C. Finished Floor Performance Properties:
 - 1. Bond Strength to Concrete: 400 PSI minimum or cohesive failure of concrete.
 - 2. Flammability: Self-extinguishing; ASTM-D-635-63.
 - 3. Fungus and Bacteria Resistance: Will not support growth of fungus or bacteria when subjected to tests; MIL-F-52505, Section 4.4.2.11.
 - 4. Wear Resistance (Taber): 60 mg, maximum loss per 1000 cycles.
 - 5. Slip resistance as required to meet accessibility and safety codes.

D. Product and Manufacturer:

1. Stonres STR (Epoxy Terrazzo) as manufactured by Stonhard.
2. Steri-Flake (Epoxy Terrazzo) as manufactured by Dudick, Inc.
3. Deco-Flake (Epoxy Terrazzo) as manufactured by TNEMEC.
4. Decorative Mosaic (Epoxy Terrazzo) by General Polymers.
5. Or equal.

2.02 COMPONENTS

- A. General: All components of the Epoxy Floor Topping system are to be coordinated by the Manufacturer and mixed and installed in strict compliance with the Manufacturer's recommendations. The following are intended to be general component descriptions only, and are not intended to alter the resin Manufacturer's specific formulation or recommendations.
- B. Surface Primer: Two component, penetrating, moisture tolerant epoxy primer applied at 150-200 square feet per gallon. Provide crack isolation membrane or coat where recommended by manufacturer.
- C. Bodycoat shall epoxy resin.
- D. Broadcast flakes into surfaces in accordance with manufacturer's recommendations. After cure sweep and remove all loose. Sand as required to create a smooth surface.
- E. Seal Coat: UV resistant top coat with excellent abrasion, chemical, and color stability.
- F. Expansion Joints:
 1. At structural expansion or control joints.
 2. Joint Filler: Elastomeric sealant.
- G. Trim and/or Divider Strips: Non-corrosive materials (plastic, PVC, etc.) only, as recommended by the Manufacturer to be compatible with the usage and exposure conditions stated for the flooring materials.
- H. Provide cove base to match color and finish of floor. Isolate as recommended by manufacturer.
- I. Colors shall be selected by Owner from custom blends based on standard colors. Each room shall have a unique color. Second floor corridor shall include a logo at the elevator entrance.

PART 3 – EXECUTION

3.01 INSPECTION

- A. Contractor shall examine the areas and conditions under which the flooring work is to be installed and notify the District of conditions detrimental to the proper and timely completion of the Work.
- B. Proceed with the Work only after deficiencies have been satisfactorily corrected. If after surface preparations voids or honeycombs appear on the concrete, repair with suitable material.
- C. Verify that all new concrete surfaces have received a steel trowel finish, slope toward the floor drains, are at least four weeks old, and have been free of standing water for at least 7 days.
- D. Verify that all surfaces have been properly cleaned and conditioned, and that curing, hardening or waterproofing agents have not been used in curing new concrete surfaces which are to receive flooring.

3.02 VENTILATION AND SAFETY

- A. The Contractor shall provide adequate temporary ventilation of all indoor areas at all times. Air changes per hour in the enclosed room shall be 12 minimum.
 - 1. Vent odors from low areas (fumes heavier than air) to the outside. Do not allow fumes to enter any air conditioning ducts or air intake ducts. Fumes are flammable; verify all fans and electrical equipment are suitable to operate in area.
 - 2. Seal off all adjacent areas. Provide Plan of Operation prior to this Work for Owner review and approval.
 - 3. Prevent fans or air movement from blowing dust particles onto wet flooring areas.
 - 4. Suitable respirators shall be used by all workers. Provide two additional respirators for Plant Personnel and Construction Inspectors.
 - 5. Installer shall use a Portable Gas Monitor in all enclosed rooms/buildings to monitor combustible levels. Monitor shall be listed by a third party as intrinsically safe to Class I, Division I, Groups A, B, C, and D. Monitor range shall be 0-100 percent with a 1 percent resolution. Monitor shall be Passport Personal Alarm as manufactured by MSA Instruments or equal.
- B. Provide suitable safety clothes and glasses for construction workers, plant personnel, and construction inspectors as necessary.
- C. Install temporary potable water eyewashes and safety showers.

- D. Keep open flames and sparks away from the area.

3.03 INSTALLATION TEMPERATURE

- A. In order to promote proper curing of the coating systems, the Contractor shall be required to maintain a minimum air temperature surrounding all structures which have surfaces to be topped with resin materials.
 - 1. Temperature requirements shall be maintained at least two days before the trowel coat topping installation begins and shall continue through the curing period required for the seal coat.
 - 2. Minimum air temperature shall be 65°F. Provide warmer conditions if required by the resin Manufacturer.
 - 3. The building heating and air handling units shall not be used by the Contractor.
- B. In addition to the ambient air requirements, the temperatures of all surfaces to receive flooring shall also be maintained at a minimum temperature of 65°F.

3.04 FLOORING INSTALLATION

- A. Comply with the Manufacturer's recommendations for preparation and priming of substrate, proportioning mixes, installation of strips, placing, curing, sealing and finishing.
- B. Once flooring operations have commenced, control all unnecessary foot traffic, construction activities, etc., in the area in order to keep substrate clean.
- C. General Substrate Preparation:
 - 1. Concrete: Mechanical clean surfaces to remove oils, fats, greases, waxes, membrane coatings, paints, etc. Mechanically scarify surfaces to remove surface laitance and profile in accordance with ICRI 310.2, (CSP) Concrete Surface Profile 3 - 5. Chip and chase terminations and at edges of floor drains and other built in components as recommended by manufacturer.
 - 2. Cover tops of floor drains with duct tape or similar material to allow placement of and finishing of abutting floor materials.
 - 3. Test floor for moisture content prior to beginning work. Do not install flooring until moisture content is within allowable ranges recommended by manufacturer.
- D. Install flooring materials at coved bases, curbs, stair treads and risers, and landings without interruptions or seams, except where divider strips, control joints and expansion joints are shown, or required, or specifically recommended by the resin Manufacturer.

- E. Provide control joints where required by manufacturer and approved on shop drawings. Install joints flush with floor by placing angle-type divider strips back-to-back with neoprene rubber filler cemented between strips.
 - 1. Install control joints immediately above all joints of structural concrete, or above all control or construction joints in new concrete slabs.
- F. Provide expansion joints where shown or required.
- G. Provide trim or finish strips along any exposed edges of flooring or along tops of coved bases that are exposed to view.
 - 1. Apply a continuous bead of clear silicone caulking along all trim strip edges to seal any gaps or irregularities between masonry (or concrete) surfaces and the trim strip material.
- H. All installation procedures shall be in strict accordance with manufacturer's recommendations and these specifications.
- I. Floor shall be smooth with a slip resistance as required to meet accessibility requirements.

3.05 CLEANING AND PROTECTION

- A. Protection:
 - 1. Provide protection for finished floor topping Work until building is ready for occupancy.
 - 2. Immediately repair any damaged surfaces in accordance with Manufacturer's instructions.
- B. Final Cleaning:
 - 1. Thoroughly wash all surfaces prior to final acceptance of the Work included under this Contract. Washing shall be by high pressure water cleaner with TSP (trisodium-phosphate).

END OF SECTION

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SECTION 09 69 00
RAISED FLOOR SYSTEM

PART 1 – GENERAL

1.1 THE REQUIREMENT

- A. The Contractor shall furnish a raised floor system, including panels, wearing surfaces, grid, pedestals and related items.
- B. This flooring system shall consist of a series of square modular floor panels with an elevated supporting system providing an underfloor space for conduits, cables and other services. System shall be provided with bracing and accessories for a complete and stable floor system able to resist all code required forces and capable of supporting equipment shown within each room to receive raised floor system.

1.2 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. Without limiting the generality of these specifications, the Work shall conform to the applicable requirements of the following documents:
 - 1. ASTM E84 – Test for Surface Burning Characteristics of Building Materials.
 - 2. FS SS-W-40 – Wall Base: Rubber and Vinyl Plastic.
 - 3. FS QQ-A-591D – Aluminum Alloy Die Castings.
 - 4. Federal Specifications (FS).

1.3 DESIGN CRITERIA

- A. Raised Floor System: Unless otherwise shown on the Contract Drawings or required by the Detailed Specifications, the concrete filled raised floor system shall conform to the following minimum design criteria:
 - 1. Floor panels, including those with cutouts shall be capable of supporting a uniform live load of 250 pounds per square foot, and a concentrated load of 1000 pounds applied (not concurrently with uniform load) anywhere on one square inch, with a deflection under either load not to exceed 0.080 inches and a permanent set not to exceed 0.010 inches.
 - 2. Pedestal assemblies shall be capable of resisting a 5000 pound axial load per pedestal without deformation of any part and with a resistance to horizontal force of 200 pounds applied to top of pedestal in any direction without panels or other supports in place.

3. Grid system stringers shall be capable, without panels in place, of supporting a concentrated load of 200 pounds at center of span with a permanent set not to exceed 0.010 inches.
 4. Ultimate strength of raised floor system shall be capable of sustaining twice the enumerated loads at ultimate strength (failure).
- B. The seismic design requirements of the Arkansas Building Code shall be incorporated in the design of the raised floor system components.
- C. Components shall have positive contact for continuous electrical grounding of entire floor system.

1.4 SUBMITTALS

- A. The Contractor shall submit working drawings, shop drawings and material specifications for the approval of the Engineer in accordance with the requirements of the General Conditions and the submittal procedures of Division 1. Working drawings and shop drawings shall include, but not be limited to:
1. Plan indicating full extent of access floor system.
 2. Details of components, connections, bracing, and anchorages.
 3. Grilles and cable cutout locations.
 4. Coordinated openings with equipment supplier(s).
 5. Finish selection chart.
 6. Manufacturer's installation instructions.
 7. Manufacturer's maintenance instructions, including recommended products and procedures, and source of supply nearest to job site.
 8. Certification from an acceptable independent testing agency verifying that samples and shop drawings submitted represent a raised floor system complying with design criteria specified.
 9. Calculations by a licensed Professional Engineer substantiating structural design criteria specified.
- B. The Contractor shall also submit, as a minimum, the following samples:
1. One 12 inch by 12 inch corner cut of floor panel showing internal construction.
 2. Two full size panels with wearing surface.
 3. One perforated panel.

4. Four pedestals.
5. One grid system for a typical panel.
6. One of each type of grommet and cable cutout and gasket.

1.5 SHIPPING, HANDLING AND STORAGE

- A. Deliver all materials in unopened undamaged cartons or crates bearing the manufacturer's label.
- B. Store materials in a clean and dry area and protect from damage and contamination. Comply with manufacturer's storage instructions.

PART 2 – PRODUCTS

2.1 MATERIALS AND FABRICATION

- A. Standard Floor Panels: Modular panels shall be interchangeable with other standard floor panels, easily placed and removed without disturbing adjacent panels or understructure by one person using a portable lifting device, free of exposed metal edges in installed position with floor covering in place.
 1. Nominal size of panels shall be 24-inches x 24-inches, with a minimum depth of 1-1/8 inches.
 - a. Panels shall be galvanized steel, filled with lightweight, high-strength concrete.
 - b. Wearing surface shall be a high pressure plastic laminate, 1/8-inch thick, manufactured specifically for a raised floor system for computer rooms.
 2. Panels shall be fabricated to the size required plus or minus 0.005 inches with a squareness tolerance, expressed as the difference between diagonal measurements from corner to corner of plus or minus 0.005 inches and with a flatness tolerance of plus or minus 0.010 inches measured on diagonal on top and bottom of panel. Panels provided shall be free of weld marks, ridges and other manufacturing imperfections.
- B. Pedestals: Provide manufacturer's standard pedestal assembly including base, column with provisions for height adjustment, and head (cap); made either of steel or aluminum or a combination of both.
 1. Base shall be square or circular, 1/8-inches thick minimum, with not less than 16 square inches of bearing area.

2. Provide vibration and locking mechanism for making and holding fine adjustments in height, for leveling purposes, over a range of not less than 2 inches. Include means of locking leveling mechanism at a selected height, which requires deliberate action to change height setting and prevents vibratory displacement.
 3. Head of proper type shall be provided for grid system proposed.
- C. Grid System: Provide manufacturer's standard steel modular stringer system, designed and fabricated to interlock with pedestal head and to form a grid pattern with members under each edge of each floor panel and with a pedestal under each corner of each floor panel. Protect steel components against corrosion with galvanizing and manufacturer's standard paint finish.
1. System of stringers attached to pedestals with non-bolted interlocking connections shall provide a stable understructure and prevent accidental disengagement.
 2. Provide continuous electrically conductive gasket at contact surfaces between panel and grid to deaden sound, to form an effective plenum seal, and where required, to maintain panel alignment and position.

2.2 ACCESSORY ITEMS

- A. Cutouts:
1. Fabricate cutouts in panels where indicated and grommets, and gaskets for sealing shall be manufacturer's standard and provided as required to accommodate equipment in access floor area.
 2. Reinforce panels or provide additional support where required if cutouts lessen panels' effective strength.
- B. Perforated Panels:
1. Manufacturer's standard perforated air flow panels with high pressure plastic laminate wearing surface shall be located at areas indicated on the Contract Drawings.
 2. Provide panels with tapered flange frames, and adjustable control dampers.
- C. Manufacturer's standard portable lifting devices, suitable for the floor covering provided, shall be furnished.
- D. Adhesives, primers and all accessories required for a complete flooring system and complying with manufacturers standards shall be furnished.

- E. Provide manufacturers standard ramps, handrails, steps, lateral bracing and fascia. Fascia shall be installed adjacent to ramps and steps to close gaps. Install lateral bracing to provide a stable floor system.

2.3 SPARE PARTS

- A. Unless otherwise required by the Detailed Specifications, the Contractor shall furnish the following spare parts:
 - 1. Six (6) panels with wearing surface.
 - 2. Six (6) pedestals.
 - 3. Three (3) of each size perforated panel.
 - 4. Anchors, fasteners and gaskets for six (6) panels and pedestals and for three (3) perforated panels.
 - 5. Four (4) sets of grommets and cable cutout appurtenances.
 - 6. Two (2) each of special tools and adjusting wrenches.
 - 7. Two (2) panel lifting devices.

PART 3 – EXECUTION

3.1 PEDESTALS

- A. Layouts:
 - 1. Establish grid system from the Contract Drawings and approved Shop Drawings and indicate pedestal locations on concrete sub-floor so that work by others can be installed without interference to pedestals.
 - 2. Provide additional pedestals where grid is disrupted by columns, walls, and cutouts that impair strength of floor system.
 - 3. Secure grid members to pedestal heads in accordance with manufacturer's instructions.
- B. Adhesive:
 - 1. Verify that adhesive achieves bond to slab before commencing work.
 - 2. Prepare surface, mix and apply adhesive complying with manufacturer's instructions.
 - 3. Apply adhesive to locate pedestals at positions indicated.

- C. Level pedestals with transit readings to establish height required within tolerance specified and lock leveling adjustment.

3.2 FIELD PANELS

- A. Set panels in place with sides abutting and bearing uniformly on supports.
- B. Verify that 24 inch square standard panels are interchangeable and fit snugly but do not bind when placed in alternate positions. Make adjustments in grid framing system alignment as required to achieve interchangeability of panels.
- C. Installed finish floor height measured from top of base floor to top of finished floor panels shall be as indicated on the Contract Drawings.

3.3 ACCESSORY ITEMS

- A. Provide cutouts required for services penetrating panels, and seal edges with plastic angles, channels or gaskets. Fill cutouts with suitable material to provide a tight fit around the penetrating service and panel cutout.
- B. Install perforated panels of size and at locations indicated. Install other accessories as indicated on the Contract Drawings and approved Shop Drawings.
- C. Verify that all services for equipment have been provided with required penetration of floor panels.

3.4 CLEANING

- A. No debris or dust shall be allowed to accumulate under the raised floor system. Thoroughly vacuum clean space under floor as each row of panels is installed.
- B. After installation of raised floor system has been completed, the floor shall be vacuum cleaned and covered with a continuous sheet of protective paper or plastic. Should breaks occur in this covering, immediately repair by placing an additional thickness of protective material over the damaged area. Otherwise, the entire cover shall be immediately replaced.
- C. Replace floor panels which are chipped, broken, stained, scratched or otherwise damaged, or do not conform to specified requirements.
- D. Prior to final inspection, the floor surface shall be cleaned in accordance with manufacturer's recommendations.

END OF SECTION

SECTION 09 74 50
RESINOUS FLOORING

PART 1 – GENERAL

1.1 THE REQUIREMENT

- A. Furnish all labor, materials, equipment, and incidentals required to furnish and install seamless Resinous Flooring systems as shown and specified.
- B. Resinous Flooring Work includes:
 - 1. Surface preparation and installation of Resinous Flooring.
 - 2. Installation of Resinous Flooring.
 - 3. Installation of Resinous Integral.
 - 4. All clean up following installation of the Resinous Flooring.
- C. Coordination: Review installation procedures and coordinate the installation of items that must be installed with the Resinous Flooring systems.
- D. Installation shall occur prior to installation of Laboratory Casework. Protect floor prior to installing laboratory equipment and casework.

1.2 QUALITY ASSURANCE

- A. Manufacturer's Instructions: In addition to specified requirements, strictly comply with resin Manufacturer's printed instructions and recommendations, including:
 - 1. Preparation of substrate.
 - 2. Storing.
 - 3. Mixing and applying materials.
 - 4. Curing of resinous flooring work.
- B. Installer's Qualifications:
 - 1. All Resinous Flooring shall be applied only by a firm which:
 - a. Is a recognized installer of resinous flooring systems and has at least five (5) years proven experience in the installation and repair of resinous flooring, or similar type flooring systems.

- b. Is approved and certified by the materials Manufacturer to install the product.

C. System Coordination and Source:

- 1. To obtain a completely coordinated flooring system with compatible components, all materials shall be supplied and/or coordinated through the Manufacturer of the flooring resins.
- 2. All components, and all installation methods and procedures shall be in strict conformance with the resin Manufacturer's written recommendations.

D. Resinous Flooring components shall meet volatile organic compounds regulations during installation and all air regulations shall be complied with during installation of work.

1.3 SUBMITTALS

A. Samples:

- 1. Submit 6-inch samples of accessories such as divider strips, edge strips, expansion strips, etc.
- 2. Provide flat samples, 12" x 12" minimum, of the full thickness flooring materials, with differing amounts of skid-resistance:
 - a. Provide a minimum of three such samples, installed on hardboard backing for Owner review, and selection of surface finish required.
- 3. Color sample charts to be provided for initial selection and followed with up to 5 samples of the actual colors produced on hardboard for color verification.

B. Shop Drawings:

- 1. Submit Shop Drawings for layout and details of all stop and divider strips, expansion strips and base strips.

C. Manufacturer's Certificate:

- 1. Submit copies of manufacturer's written certification that all resinous flooring system materials meet or exceed the properties specified herein.

D. Qualifications:

- 1. Submit installer qualifications including letter from manufacturer stating that the installer is certified and approved to install flooring. Provide letter showing a listing a minimum of five projects of similar scope and using the same materials and manufacturer proposed.
- 2. Submit detailed Plan of Operation for building ventilation and access restrictions prior to beginning Work in any new area or location.

PART 2 – PRODUCTS

2.1 SYSTEM

- A. The flooring system shall consist of the following:
 - 1. Concrete surface preparation and moisture testing in accordance with manufacturer's printed recommendations and installation instructions.
 - 2. Surface priming with a moisture tolerant primer with excellent wetting properties.
 - 3. An epoxy base coat with multi-colored quartz aggregate broadcast.
 - 4. Two topcoats as required to provide desired finish.
 - 5. Final cleaning.
- B. Finished Floor Physical Properties:
 - 1. Compressive Strength: 6,000 minimum PSI after 7 days.
 - 2. Flexural Strength: 2,200 PSI minimum.
 - 3. Tensile Strength: 1,500 PSI minimum.
 - 4. Hardness (Shore D): 80-90.
 - 5. Nominal Finished Floor Thickness:
 - a. 3/16-inch minimum, unless indicated otherwise at specific areas. Provide additional coats as recommended by manufacturer to achieve desired thickness.
- C. Finished Floor Performance Properties:
 - 1. Bond Strength to Concrete: 400 PSI minimum or cohesive failure of concrete.
 - 2. Flammability: Class 1.
 - 3. Wear Resistance (Taber): 85 mg, maximum loss per 1000 cycles.
 - 4. Slip resistance as required to meet accessibility and safety codes.
- D. Product and Manufacturer:
 - 1. Stonblend GSI as manufactured by Stonhard.
 - 2. Decorative Quartz TQ as manufactured by Tennant.

3. Sikafloor DecoDur Quartz TG by Sika.

2.2 COMPONENTS

- A. General: All components of the Resinous Flooring system are to be coordinated by the Manufacturer and mixed and installed in strict compliance with the Manufacturer's recommendations. The following are intended to be general component descriptions only and are not intended to alter the resin Manufacturer's specific formulation or recommendations.
- B. Surface Primer: Manufacturer's recommended penetrating, moisture tolerant epoxy primer applied at 150-200 square feet per gallon. Provide crack isolation membrane or coat where recommended by manufacturer.
- C. Base coat: Manufacturer's recommended troweled epoxy mortar with colored quartz silica aggregate.
- D. Epoxy Seal Coat: Manufacturer's recommended clear leveling epoxy sealer. Provide one or two coats as recommended by manufacturer.
- E. Seal Coat: Manufacturer's recommended UV resistant top coat with excellent abrasion, chemical, and color stability.
- F. 4" Base: Integral base shall be installed in accordance with manufacturer's recommendations and instructions.
- G. Expansion Joints:
 - 1. At structural expansion or control joints.
 - 2. Joint Filler: Elastomeric sealant.
- H. Trim and/or Divider Strips: Non-corrosive materials (plastic, PVC, etc.) only, as recommended by the Manufacturer to be compatible with the usage and exposure conditions stated for the flooring materials.
- I. Colors shall be selected by Owner from custom blends based of standard colors. Each room shall have a unique color. Second floor corridor shall include a logo at the elevator entrance.

2.3 SPARE PARTS

- A. Unless otherwise required by the Detailed Specifications, the Contractor shall furnish the following spare parts:
 - 1. Six (6) panels with wearing surface.
 - 2. Six (6) pedestals.

3. Three (3) of each size perforated panel.
4. Anchors, fasteners and gaskets for six (6) panels and pedestals and for three (3) perforated panels.
5. Four (4) sets of grommets and cable cutout appurtenances.
6. Two (2) each of special tools and adjusting wrenches.
7. Two (2) panel lifting devices.

PART 3 – EXECUTION

3.1 INSPECTION

- A. Contractor shall examine the areas and conditions under which the flooring work is to be installed and notify the Engineer and Owner of conditions detrimental to the proper and timely completion of the Work.
- B. Proceed with the Work only after deficiencies have been satisfactorily corrected. If after surface preparations voids or honeycombs appear on the concrete, repair with suitable material.
- C. Verify that all new concrete surfaces have received a steel trowel finish, slope toward the floor drains, are at least four weeks old, and have been free of standing water for at least 7 days.
- D. Verify that all surfaces have been properly cleaned and conditioned, and that curing, hardening or waterproofing agents have not been used in curing new concrete surfaces which are to receive flooring.

3.2 VENTILATION AND SAFETY

- A. The Contractor shall provide adequate temporary ventilation of all indoor areas at all times. Air changes per hour in the enclosed room shall be 12 minimum.
 1. Vent odors from low areas (fumes heavier than air) to the outside. Do not allow fumes to enter any air conditioning ducts or air intake ducts. Fumes are flammable; verify all fans and electrical equipment are suitable to operate in area.
 2. Seal off all adjacent areas. Provide Plan of Operation prior to this Work for Owner review and approval.
 3. Prevent fans or air movement from blowing dust particles onto wet flooring areas.
 4. Suitable respirators shall be used by all workers. Provide two additional respirators for Plant Personnel and Construction Inspectors.

5. Installer shall use a Portable Gas Monitor in all enclosed rooms/buildings to monitor combustible levels. Monitor shall be listed by a third party as intrinsically safe to Class I, Division I, Groups A, B, C, and D. Monitor range shall be 0-100 percent with a 1 percent resolution. Monitor shall be Passport Personal Alarm as manufactured by MSA Instruments or equal.
- B. Provide suitable safety clothes and glasses for construction workers, plant personnel, and construction inspectors as necessary.
- C. Install temporary potable water eyewashes and safety showers.
- D. Keep open flames and sparks away from the area.

3.3 INSTALLATION TEMPERATURE

- A. In order to promote proper curing of the coating systems, the Contractor shall be required to maintain a minimum air temperature surrounding all structures which have surfaces to be topped with resin materials.
 1. Temperature requirements shall be maintained at least two days before the trowel coat topping installation begins and shall continue through the curing period required for the seal coat.
 2. Minimum air temperature shall be 65°F. Provide warmer conditions if required by the resin Manufacturer.
 3. The building heating and air handling units shall not be used by the Contractor.
- B. In addition to the ambient air requirements, the temperatures of all surfaces to receive flooring shall also be maintained at a minimum temperature of 65°F.

3.4 FLOORING INSTALLATION

- A. Comply with the Manufacturer's recommendations for preparation and priming of substrate, proportioning mixes, installation of strips, placing, curing, sealing and finishing.
- B. Once flooring operations have commenced, control all unnecessary foot traffic, construction activities, etc., in the area in order to keep substrate clean.
- C. General Substrate Preparation:
 1. Concrete: Mechanical clean surfaces to remove oils, fats, greases, waxes, membrane coatings, paints, etc. Mechanically scarify surfaces to remove surface laitance and profile in accordance with ICRI 310.2, (CSP) Concrete Surface Profile 3 - 5. Chip and chase terminations and at edges of floor drains and other built in components as recommended by manufacturer.

2. Cover tops of floor drains with duct tape or similar material to allow placement of and finishing of abutting floor materials.
 3. Test floor for moisture content prior to beginning work. Do not install flooring until moisture content is within allowable ranges recommended by manufacturer.
- D. Install flooring materials without interruptions or seams, except where divider strips, control joints and expansion joints are shown on structural drawings, or required, or specifically recommended by the resin Manufacturer.
- E. Provide control joints where required by manufacturer and approved on shop drawings. Install joints flush with floor by placing angle-type divider strips back-to-back with neoprene rubber filler cemented between strips.
1. Install control joints immediately above all joints of structural concrete, or above all control or construction joints in new concrete slabs.
- F. Provide expansion joints where shown or required.
- G. Provide trim or finish strips along any exposed edges of flooring or along tops of coved bases that are exposed to view.
1. Apply a continuous bead of clear silicone caulking along all trim strip edges to seal any gaps or irregularities between masonry (or concrete) surfaces and the trim strip material.
- H. All installation procedures shall be in strict accordance with manufacturer's recommendations and these specifications.
- I. Floor shall be smooth with a slip resistance as required to meet accessibility requirements.

3.5 CLEANING AND PROTECTION

- A. Protection:
1. Provide protection for finished floor topping Work until building is ready for occupancy.
 2. Immediately repair any damaged surfaces in accordance with Manufacturer's instructions.
- B. Final Cleaning:
1. Thoroughly wash all surfaces prior to final acceptance of the Work included under this Contract. Washing shall be in strict accordance with manufacturer's requirements.

END OF SECTION

SECTION 09 78 23
INTERIOR PHENOLIC WALL PANELS

PART 1 – GENERAL

1.1 THE REQUIREMENT

- A. Work includes interior decorative wall panels with different colors, sizes, thicknesses and textures, for the fabrication of:
 - 1. Wall paneling.
 - 2. Functional cabinetry.
 - 3. Wall lining, for uses such as fume hoods, back splashes, etc.

1.2 RELATED SECTIONS

- A. Section 06 20 00 - Finish Carpentry.
- B. Section 07 92 00 - Caulking and Sealants.
- C. Section 09 29 00 - Gypsum Board.

1.3 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. European Standards (EN):
 - 1. EN 438-2 - High-pressure decorative laminates (HPL) - Sheets based on thermosetting resins - Part 2: Determination of properties.
- C. International Organization for Standardization (ISO):
 - 1. ISO 178 - Determination of Flexural Properties.
 - 2. ISO 527-2 - Determination of Tensile Properties.
 - 3. ISO 1183 - Determination of Density.
 - 4. ISO 9001 - Quality Management System
 - 5. ISO 14001 - Environmental Management Systems

- D. Scientific Equipment & Furniture Associate (SEFA) Laboratory Surfaces Recommended Practices.
 - 1. Chemical Resistance: Third-party evaluation of chemical resistance is based on SEFA 8 - 2010 Laboratory Grade Casework. Standard list of 49 chemicals (volatile and non-volatile). Result: Pass
- E. UL (Underwriters Laboratories) certification:
 - 1. GREENGUARD and GREENGUARD GOLD certification for chemical emissions.
- F. Forestry Stewardship Council (FSC™).
- G. Environmental Product Declaration (EPD) in accordance with ISO 14025 and EN 15804.
- H. Fraunhofer IPA Cleanroom certifications:
 - 1. Evaluation of chemical resistance based on 24 hours immersion test.
 - 2. Riboflavin test: Assessment of cleanability of surfaces.
 - 3. Determination of outgassing behavior of materials: VOC/SVOC, anions, ammoniac and ammonium nitrate compounds.
 - 4. Resistance to vaporized hydrogen peroxide sterilization.
- I. Health Product Declaration (HPD) according to HPD Open Standard v2.3 third party verified by Green Seal.
- J. USDA (United States Department of Agriculture) certified biobased content.

1.4 SUBMITTALS

- A. Product Data: Manufacturer's technical data on the product, including:
 - 1. Material Property Datasheet (MPD)
 - 2. Machining and installation general guidelines.
 - 3. Storage and handling recommendations.
 - 4. Cleaning recommendations.
 - 5. Installation details per manufacturer.
- B. Verification Samples: For each finish product specified, samples of a minimum of 3.5 inches by 3.5 inches (89 mm by 89 mm) representing actual product, color, and patterns. Sample edges may vary from field panel edges.

- C. SEFA Certificate of Analysis by third party approved SEFA laboratory.
- D. UL GREENGUARD and GREENGUARD GOLD certificates.
- E. Product-specific Environmental Product Declaration (EPD).
- F. Health Product Declaration (HPD) third party verified.
- G. Fraunhofer Cleanroom Certificates.
- H. USDA (United States Department of Agriculture) certified biobased content.
- I. 10 years warranty.
- J. Third party disinfection reports.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: All panel products specified in this section will be supplied by a single manufacturer with 60 years of experience and with the following certifications:
 - 1. ISO 9001.
 - 2. ISO 14001.
- B. Installer Qualifications: All products listed in this section are to be installed by an installing firm who can prove evidence of installing wall panel systems.

1.6 TRANSPORT, STORAGE, AND HANDLING

- A. Transport:
 - 1. Transport panels using machinery recommended by manufacturer or having sufficient capacity and features to meet manufacturer's recommendations.
 - 2. Secure and provide protective materials for transport of panels in accordance with manufacturer's recommendations.
- B. Storage: Store panels horizontally in protective, suitable environmental conditions as recommended by manufacturer.
- C. Handling: Handle panels according to manufacturer's recommendations.

1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

- A. Panel(s) shall be provided with a warranty for a period of ten (10) years after the date of delivery of the Panel(s) to the Buyer, that the Panel(s) conform to the specifications stated in the Material Properties Datasheet for the Panel(s) published on the date of delivery.

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. Trespa International B.V., P.O. Box 110, 6000 AC Weert Wetering 20, 6002 SM Weert, The Netherlands.
- B. Formica Corporation, 10155 Reading Road, Cincinnati, OH, 45241, United States.

2.2 PRODUCTS

- A. Basis of Design Product: Trespa® TopLab® VERTICAL (or equivalent).
 - 1. Description: Compact, homogeneous high-pressure laminate sheets (also known as phenolic resin panels) consisting of layers of natural fibers (wood) impregnated with phenolic resins and acrylic-based surface layer(s) on one or both sides, having decorative colors or designs, acrylic clear surface coat, and cured with manufacturer's Electron Beam Curing (EBC) method.
 - 2. Panel Attributes:
 - a. Smooth machineability.
 - b. Scratch resistance.
 - c. Impact resistance.
 - d. Chemical resistance.
 - e. Resistance to many aggressive cleaning chemicals.
 - f. Does not support bacterial growth.
 - g. Suitable for hygienic applications.
 - 3. Panel Core: Standard or Fire retardant (FR) black core.
 - 4. Panel Facing: Manufacturer's standard acrylic sheets with acrylic clear coat, cured with manufacturer's proprietary Electron Beam Curing method.
 - 5. Panel Size: 1524 by 3048 mm (5 by 10 feet).

6. Panel Thickness: 13mm (1/2 inch).
7. Panel Type: Single sided.
8. Panel Decor: Selected from manufacturer's full range of Uni Colors, Wood Decors, Naturals, Metallics, Lumen and Focus color lines.
9. TS 210 – Concealed Fastener System.

2.3 PERFORMANCE

- A. Performance Properties: See Manufacturer's latest certifications and Material Product Datasheet for properties and performance on www.trespa.info.

2.4 FABRICATION

- A. Fabricate solid phenolic panels according to manufacturer's recommendations and approved submittals.

PART 3 – EXECUTION

3.1 PRIOR TO FABRICATION

- A. Acclimate and prepare panels according to manufacturer's written instructions prior to fabrication.
- B. Remove protective materials from panels immediately prior to fabrication.

3.2 PREPARATION

- A. Acclimate panels according to manufacturer's written instructions prior to fabrication.
- B. Prior to beginning installation of work surfaces, inspect and verify that no irregularities in jobsite conditions exist that would affect quality of execution of the work as specified.

3.3 INSTALLATION

- A. Install panels per specification, as shown on shop drawings, and per manufacturer's recommendations.
- B. Install the work so as to satisfy all warranty requirements.
- C. Coordination: Coordinate the work of this Section with the schedule and requirements of other work being performed in the area at the same time including, but not limited to, general construction work, mechanical and electrical connections to and in the fume hoods and other similar or related work.

3.4 CLEANING

- A. Clean surfaces of Trespa TopLab VERTICAL as recommended by manufacturer in writing, and as follows:
1. General: The surfaces of Trespa TopLab VERTICAL can be easily cleaned with a dry or damp cloth and a mild household cleaner, or water and soap. Wipe damp surfaces with an absorbent cloth. It is not recommended to use concentrated acid, caustics, abrasives, or polishing agents.
 2. Severe Soiling: Hot water and an interior detergent- or soap-based cleaning agent, applied with a sponge or soft nylon brush. Apply the diluted cleaning agent to the surface and leave it to soak. Then rinse off with clean water and dry with an absorbent cloth. It may be necessary to remove old stains or very stubborn marks with bleach. Wash the surface down thoroughly afterwards with clean water and dry with an absorbent cloth.
 3. Special Staining: Solvent-based varnishes and adhesives and other soluble but strong stains should be removed with organic solvents such as acetone, white spirit, turpentine or petroleum.

3.5 DISINFECTING

- A. Disinfect surfaces as recommended by manufacturer, using commonly used disinfectants such as the following:
1. Alcohol, preferably 60-70% solution in water.
 2. Peroxide compounds (hydrogen peroxide and organic peracids).
 3. Quaternary ammonia compounds.

END OF SECTION

SECTION 10 28 00
TOILET AND BATH ACCESSORIES

PART 1 – GENERAL

1.01 THE REQUIREMENT

- A. Furnish and install toilet and bath accessories as shown on the Drawings and specified herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 04 20 00 – Unit Masonry.
- B. Section 10 21 13 – Metal Toilet Partitions.

1.03 SUBMITTALS

- A. In accordance with the procedures and requirements set forth in Section 01 33 00 – Submittal Procedures, submit the following:
 - 1. Manufacturer's data.

1.04 QUALITY ASSURANCE

- A. Coordinate with other work to avoid interference and to assure proper operation and servicing of accessory units.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. The following manufacturers are approved for use.
 - 1. American Specialties Inc.
 - 2. Bobrick Washroom Equipment, Inc.
 - 3. Bradley Corp.
 - 4. McKinney Parker
 - 5. Aquatic Bath

2.02 MATERIALS

- A. Provide the following (Model numbers are Bobrick Washroom Equipment, Inc. numbers and are used for convenience only).
1. Surface Mounted Toilet Tissue Dispenser for Two Rolls At each water closet - Model B-686, Type 304 -stainless, polished finish, concealed stainless steel wall plate.
 2. Surface Mounted Paper Towel Dispenser and Disposal: Satin finish stainless steel, 12 gallon removable receptacle. Dispenses 600 C-fold, 800 multifold, or 1100 single fold towels. Model B-3949 with skirt.
 3. Wall Mirrors: One (1) at each lavatory - stainless steel angle frame mirror, Model B-290. Corners shall heliarc welded, ground and polished smooth. No. 1 quality, ¼" (6mm) select float glass mirror electrolytically copper-plated; guaranteed against silver spoilage for 15 years. Provide 1/8 inch (3mm) thick, water-resistant, shock-absorbing padding and 20 gauge galvanized steel back. Concealed mounting. Size as shown on Drawings.
 4. Frameless Wall Mirror: Type I transparent flat type, Class 1-clear glass. Glazing Quality q1 ¼" thick conforming to ASTM C1036. Coat glass on one surface with silver coating, copper protective coating and mirror backing paint. Silver coating shall reflect 83 percent or more of incident light when viewed through ¼" glass. Silver coating shall be free of pinholes or other defects. Copper and backing paint shall protect mirror from damage. Provide frameless mirrors of size shown on drawings. Provide mirror manufacturer's suggest mounting accessories.
 5. Mop Holder: 18 gauge, 304 stainless steel shelf, hooks and anti-slip mop holders with spring loaded rubber cam., 34 inch, Model B-239 x 34.
 6. Grab Bars: 1-1/2 inch diameter, 18 gauge, stain finish, Type 304 stainless steel, concealed mounting with set screws. Joints and supports shall be contour cut and heliarc welded. Length shall be as indicated on the Drawings and shall comply with the requirements of the Americans with Disabilities Act.
 7. Sanitary Napkin Disposal: 22 gauge stainless steel, type 304, satin finish, seamless flanges, and self-closing door(s). Capacity shall be 1.2 gallons (4.6 liters). Retain receptacle behind cabinet door with tumbler lock. Surface mounted: Model B-254.
 8. Folding Shower Seat: Meet American with Disability Act. Seat shall be constructed of durable, water-resistant, solid phenolic slats. Frame and mounting brackets shall be Type 304 stainless steel able to support a minimum of 250 pounds. Model B-5181 or Model B-5171.

9. Robe Hooks: Three stainless steel hooks and flanges, bright polished finish mounted to a four inch high, 1/2 inch thick solid laminated plastic mounting strip with wood grain finish. Model B-232.
10. Surface Mounted Soap Dispenser: 304 stainless steel back and body with satin finish. Capacity of 40 fluid ounces. Corrosion-resistant valve and dispenser. Unbreakable refill window. Vandal resistant. Large, locked, hinged, stainless steel filler top. Model B-2112.
11. Shower Curtain and Rod: Provide one inch diameter stainless steel shower curtain rod with concealed fasteners Model B-207 or custom shaped curtain rod where shown on Drawings. Provide opaque, matte white vinyl 0.008 inch (2mm) thick shower curtain with nickel-plated brass grommets at 6" centers. Hem edges. Size to fit opening of shower stalls. Provide stainless steel shower curtain hooks.
12. Surface Mounted Seat Cover Dispenser: Satin finish 304, 20 gauge, stainless steel dispenser seamless construction. Dispenser shall have capacity of 500 paper toilet seat covers. Model B-4221.
13. Hand Dryer : Durable, 22 gauge steel with exposed surface type 304 stainless steel with a #4 satin finish with vertical grain. Slim design to limit project from wall to 4". Provide unit with automatic sensor. Unit shall have dual air outlets and a 1/7 hp motor sealed ball bearings at drive shaft end and self-lubricating sleeve bearing at non drive end and equipped with automatic thermal overload switch. Heating elements shall be located on outlet side of fan protected from vandals and have a thermal overload switch. Automatic sensor shall turn on unit when sensor path is crossed and turn off when removed from sensor path. Unit shall turn off approximately 1 1/2" minutes if an object is not moved from the sensor path and reset after item is removed from the sensor path. 115 V AC, 15 amp, 1725 Watts, 60 Hz. Single Phase, UL listed. Unit shall have 10 year warranty except for motor brushes shall be warranted for a minimum of 3 years. Model B-7128
14. Prefabricated Shower Unit – Aquatic, ANSI, ADA accessible, series, 13636BFSBTTR 36 x 36, Acrylx Alcove Center Drain One-Piece Shower - White – interior dimensions 36" x 36" x 76 3/4", Pattern: Classic Subway Tile (ST). 1/2" change of level -beveled threshold.

PART 3 – EXECUTION

3.01 INSPECTION

- A. Examine substrates, previously installed inserts and anchorages necessary for mounting of toilet accessories and other conditions under which installation is to occur and notify the Contractor of conditions detrimental to proper completion of work. Do not proceed until unsatisfactory conditions have been corrected in a manner acceptable.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions, using fasteners which are appropriate to substrate and recommended by the manufacturer of the unit. Install plumb and level, firmly anchored in locations indicated.
- B. Install mirrors with back frame concealed fasteners.
- C. Mounting heights shall comply with the American with Disabilities Act.

3.03 ADJUST AND CLEAN

- A. Adjust for proper operation of that mechanisms function smoothly.
- B. Clean and polish exposed surfaces after removing protective coating.

END OF SECTION

SECTION 11 40 00
FOODSERVICE EQUIPMENT

PART 1 – GENERAL

1.01 THE REQUIREMENT

- A. The Contractor shall furnish, install, and place into satisfactory operation Foodservice Equipment and appliances shown on the Contract Drawings in Break Room, Pantry, Parents Room and specified herein.
- B. Section includes:
 - 1. AAB Compliant Foodservice equipment consisting of but not limited to the following:
 - a. Full-size Refrigerator
 - b. Under-counter ice maker
 - c. Counter top Microwave Ovens
 - d. Coffee maker
 - e. Water dispenser machine
 - f. Counter top pass thru refrigerator.

1.02 RELATED SPECIFICATIONS

- A. Division 06 – Wood, Plastics, and Composites
- B. Division 22 – Plumbing
- C. Division 26 – Electrical.

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Arkansas State Building Code
- B. ANSI/ICC A117.1 Accessible and Usable Buildings and Facilities

1.04 SUBMITTALS

- A. In accordance with the procedures and requirements set forth in the General Conditions and in applicable provisions of Division 1, the Contractor shall obtain from the equipment manufacturer and shall submit the following:

1. Manufacturer's delivery, storage, and handling requirements.
 2. Manufacturer's installation instructions and recommendations.
 3. Color Samples.
 4. Operation and Maintenance Manuals.
 5. Lists of Spare Parts, Special Tools and Supplies.
- B. Operation and maintenance manuals shall conform to the requirements set forth in the General Conditions and Division 1.
- C. Spare parts lists shall indicate sizes, quantities, and part numbers of the items to be furnished. Terms such as "1 lot of packing material" shall not be acceptable.
- D. Other applicable submittals, as required elsewhere in the Contract Documents.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. The Contractor shall deliver, store, and handle the equipment and materials provided under this Specification as specified in Section 01 61 00 – Product Requirements and Options.
- B. Foodservice equipment shall be stored in a dry and protected area in original boxes.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

- A. All Foodservice equipment model numbers provided are as manufactured by General Electric (basis of design) in stainless steel finish. The Foodservice equipment shall be provided from the same manufacturer for all Foodservice equipment specified. For any discontinued models after award of contract an equivalent model shall be furnished that matches the specified models performance, material and design layout. Equivalent manufacturers are as follows:
1. Kenmore Elite, NY
 2. Amana Avanti, MI
 3. True, MO.

2.02 MATERIALS

- A. Full-Size Refrigerator: Provide one (1) full-size ADA compliant refrigerator built to UL certified compliance specifications. Provide Stainless Steel model of highest available EER rating and Energy Star (\$41 year operational cost per Governmental Energy Star

Rating System). Basis of Design: Profile Series Refrigerator Model GYE22GYNFS by General Electric or approved equal with the following features:.

1. Minimum 22.1 cubic foot capacity, counter depth
 2. Color LCD controls with touch screen,
 3. Frost-proof freezer with automatic defrost system
 4. Interior fittings: Two vegetable baskets, adjustable shelves, door shelves.
 5. Door integrated water and ice dispenser.
 6. Advanced Water Filtration System
 7. Refrigerator to include four fixed rollers or adjustable leg levelers.
 8. Handle treated with Microban Antimicrobial Technology
- B. Microwave Oven: Provide one (1) microwave oven. Basis of Design: Profile ADA Compliant, by General Electric or approved equal with the following features:.
1. Microwave/Convection Cooking
 2. Removable Oven Racks
 3. Sensor Cooking Controls.
 4. Appearance: Stainless Steel
 5. Capacity: 1.5 cubic foot
 6. Cooking Watts: 1,000 W, 10 power levels
- C. Undercounter Ice Maker: Manitowoc UCP0050 14 $\frac{3}{4}$ " Air Cooled Undercounter Gourmet Cube Ice Machine with 25lb. Bin – 52 lb. Water filter system integrated inside machine with depth filtration and scale inhibitor, lighted bin.
- D. Under Counter Refrigerator: Whirlpool 5.1 Cu.Ft. Built-in Mini Fridge – Stainless Steel. Model #: WUR35X24HZ height 35", width 22 $\frac{3}{4}$ ", depth 24" (West Gallery)
- E. Coffee Maker: Bunn Pourover 2 Burner Coffee Maker with 2 Decanters (64 oz- each decanter), separately controlled warmers, no plumbing needed, low profile, stainless steel tank and copper tubing. Model No. H-10275 Pourover Coffee Maker, 16 x 8 x 21", brews 12 cups.
- F. Counter Top Water Dispenser: Elkay DSBSH130UVPC - Filtered (NSF/ANSI 42 and 53- Elkay 51300C WaterSentry), Refrigerated (42 – 50 degrees), Hot Water (185

degrees), sparkling water. 16 7/16" H x 10 1/4" W x 19 1/4" D. Stainless Steel, 1.5 GPH, directly plumbed, 115V/60Hz, 1200W power consumption.

- G. Countertop Pass Thru Refrigerator: True – GDM-05PT-S-HC-TSL01 Glass Door Merchandiser. Swing door pass-thru countertop stainless steel exterior, with hydrocarbon refrigerant- True Standar look Version 01. System to maintain cabinet temperatures of 33 degrees F to 38 degrees F (.5 degrees C to 3.3 degrees C). Interior NSF approved, white aluminum interior liner with stainless steel floor. LED lighting, self-closing doors, positive seal, and torsion type closure system. Low E double pane thermal insulated glass doors. Entire cabinet structure is foamed in place using high density polyurethane insulation. 2 shelves.W24" x H36 1/4" x D23 5/8", 1/5HP, V 115/60/1, Amps 2.7, NEMA 5-15P, Cord Length 9ft., weight 165 lbs. (2nd floor Lab).

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Installation of equipment and materials provided under this Specification shall be in accordance with the manufacturer's recommendations and the requirements specified in Division 01 – General Requirements.
- B. Coordinate equipment installations with Division 06 – Wood, Plastics, and Composites.

3.02 FIELD TESTING

- A. Before and after installation, inspect each piece of kitchen equipment for compliance with specified requirements.
- B. After completing installation, field test each piece of equipment to demonstrate proper operation and verify performance.
- C. Inspection and testing shall be conducted in the presence of the Engineer.
- D. Repair or remove and replace defective work as directed on completion of installation.

END OF SECTION

SECTION 22 40 00
PLUMBING FIXTURES

PART 1 – GENERAL

1.01 SUMMARY

A. Related Documents:

1. Drawings and general provisions of the Subcontract apply to this Section.
2. Review these documents for coordination with additional requirements and information that apply to work under this Section.

B. Section Includes:

1. Concrete reinforcement and accessories.
2. Water closets
3. Urinals
4. Lavatories
5. Sinks
6. Service sinks
7. Bathtubs
8. Showers
9. Drinking fountains
10. Electric water coolers
11. Emergency showers

C. Related Sections:

1. Section 07 90 00 – Joint Fillers, Sealants and Caulking for sealing fixtures to walls and floors.
2. Section 22 05 29 – Hangers and Supports for Plumbing Piping and Equipment
3. Section 22 11 19 – Domestic Water Piping Specialties or Section 22 13 19 – Sanitary Waste Piping Specialties

1.02 REFERENCES

A. General:

1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.
3. Refer to Section 22 05 00 – Common Results for Plumbing for codes and standards, and other general requirements.

B. American National Standards Institute (ANSI)

1. ANSI A112.6.1 – Supports for Off-the-Floor Plumbing Fixtures for Public Use
2. ANSI A112.18.1 – Finished and Rough Brass Plumbing Fixture Fittings
3. ANSI A112.19.1 – Enameled Cast Iron Plumbing Fixtures
4. ANSI A112.19.2 – Vitreous China Plumbing Fixtures
5. ANSI A112.19.3 – Stainless Steel Plumbing Fixtures (Designed for Residential Use)
6. ANSI A112.19.4 – Porcelain Enameled Formed Steel Plumbing Fixtures
7. ANSI A112.19.5 – Trim for Water-Closet Bowls, Tanks, and Urinals
8. ANSI Z124.1 – Gel-Coated Glass-Fiber Reinforced Polyester Resin Bathtub Units
9. ANSI Z124.2 – Gel-Coated Glass-Fiber Reinforced Polyester Resin Shower Receptor and Shower Stall Units
10. ANSI Z358.1 – Emergency Eye Wash and Shower Equipment

C. Air-Conditioning and Refrigeration Institute ARI 1010 Drinking Fountains and Self-Contained Mechanically Refrigerated Drinking Water Coolers

1.03 SUBMITTALS

- A. Submit under provisions of Section 22 05 00 – Common Results for Plumbing – Review of Materials, Section 01 33 00 – Submittal Procedures.
- B. Submit Product Data for fixtures, including sizes, utility sizes, trim, and finishes.
 1. Operation and Maintenance Data:

- a. Submit operation and maintenance data under Section 01 78 23 – Operation and Maintenance Data.
- b. Include fixture trim exploded view and replacement parts lists.

1.04 QUALITY ASSURANCE

- A. Fixtures: By same manufacturer throughout for each product specified.
- B. Trim: By same manufacturer throughout for each product specified.

1.05 WARRANTY

- A. Provide manufacturer's warranty.

PART 2 – PRODUCTS

2.01 WATER EFFICIENT PRODUCTS

- A. Where available, the contractor must purchase WaterSenseSM labeled products and other water efficient products and choose irrigation contractors who are certified through a WaterSenseSM labeled program.

2.02 ACCEPTABLE MANUFACTURERS - FIXTURES

- A. American Standard.
- B. Kohler.
- C. Toto.
- D. Fiat
- E. Elkay
- F. Substitutions: Under provisions of Section 01 25 00 Substitution Procedures.

2.03 ACCEPTABLE MANUFACTURERS - FIXTURE TRIM

- A. American Standard.
- B. Kohler.
- C. Toto.
- D. Substitutions: Under provisions of Section 01 25 00 Substitution Procedures.

2.04 ACCEPTABLE MANUFACTURERS - FLUSH VALVES

- A. American Standard.
- B. Kohler.
- C. Sloan
- D. Toto.
- E. Substitutions: Under provisions of Section 01 25 00 Substitution Procedures.

2.05 ACCEPTABLE MANUFACTURERS - WATER CLOSET SEATS

- A. Bemis.
- B. Church.
- C. Kohler.
- D. Substitutions: Under provisions of Section 01 25 00 Substitution Procedures.

2.06 ACCEPTABLE MANUFACTURERS - FIXTURE CARRIERS

- A. Josam.
- B. Mifab.
- C. J. R. Smith.
- D. Zurn.
- E. Substitutions: Under provisions of Section 01 25 00 Substitution Procedures.

2.07 ACCEPTABLE MANUFACTURERS - MIXING VALVES (THERMOSTATIC)

- A. Lawler.
- B. Leonard.
- C. Watts.
- D. Substitutions: Under provisions of Section 01 25 00 Substitution Procedures.

2.08 ACCEPTABLE MANUFACTURERS - MIXING VALVES (PRESSURE BALANCED)

- A. Leonard.
- B. Symmons.

- C. Watts.
- D. Substitutions: Under provisions of Section 01 25 00 Substitution Procedures.

2.09 ACCEPTABLE MANUFACTURERS - ELECTRIC WATER COOLERS

- A. Elkay.
- B. Halsey Taylor.
- C. Haws.
- D. Oasis.
- E. Substitutions: Under provisions of Section 01 25 00 Substitution Procedures.

2.10 ACCEPTABLE MANUFACTURERS - EMERGENCY SAFETY EQUIPMENT

- A. Bradley.
- B. Guardian.
- C. Haws.
- D. Substitutions: Under provisions of Section 01 25 00 Substitution Procedures.

2.11 WATER CLOSET (WC)

- A. Bowl: NSI A112.19.2; wall-hung siphon-jet vitreous-china closet bowl, with elongated rim, 1-1/2 inch spud, china bolt caps; 1.28 GPF, or equal.
- B. Flush Valve: ANSI A112.18.1; exposed, chrome-plated, diaphragm type with touchless sensor, escutcheon, seat bumper, lock stop cap and vacuum breaker. Refer to Fixture Schedule of Contract Documents for basis of design or equal.
- C. Seat: Solid white plastic, open front, extended back, self-sustaining hinge, brass bolts, without cover. Refer to Fixture Schedule of Contract Documents for basis of design or equal
- D. Wall Mounted Carrier: ANSI A112.6.1; adjustable (horizontal) or non-adjustable (vertical) cast-iron frame, integral drain hub and vent, adjustable spud, lugs for floor and wall attachment, threaded fixture studs with nuts and washers. Refer to Fixture Schedule of Contract Documents for basis of design or equal

2.12 URINAL (UR-1)

- A. Urinal: ANSI A112.19.2; vitreous china, wall-hung [washout] [blowout] urinal with shields, integral trap, [removable stainless-steel strainer,] 3/4-inch [top] [back] spud, steel

supporting hanger; Refer to Fixture Schedule of Contract Documents for basis of design or equal.

- B. Flush Valve: ANSI A112.18.1; exposed, chrome-plated, diaphragm type with touchless sensor, escutcheon, integral screwdriver locking stop cap, vacuum breaker; Refer to Fixture Schedule of Contract Documents for basis of design or equal
- C. Wall Mounted Carrier: ANSI A112.6.1; cast-iron and steel frame with tubular legs, lugs for floor and wall attachment, threaded fixture studs for fixture hanger, bearing studs; Refer to Fixture Schedule of Contract Documents for basis of design or equal.
- D. Flush Rate: Pint unit, the flush rate shall be 1/8 gallons per flush or less.
- E. Flushometers: Flushometer for urinal-type fixture. Include brass body with corrosion-resistant internal components, non-hold-open feature, control stop with check valve, vacuum breaker, copper or brass tubing, and polished chrome-plated finish on exposed parts.

- 1. Consumption: 1/8 gallons per flush

2.13 LAVATORY (LAV-1)

- A. Lavatory: ANSI A112.19.2; vitreous-china self-rimming undermount countertop lavatory, 16"-3/4" x 13-1/4" x 5-1/2" oval bowl with drillings on center hole, front overflow, seal of putty, caulking, or concealed vinyl gasket; Refer to Fixture Schedule of Contract Documents for basis of design or equal.
- B. Trim: ANSI A112.18.1; chrome-plated combination supply fitting with pop-up waste, open-grid strainer, water-economy aerator, touchless sensor, chrome-plated 17-gauge brass P-trap with clean-out plug and arm with escutcheon; Refer to Fixture Schedule of Contract Documents for basis of design or equal.
- C. Faucet: Single-control mixing valve. Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture holes; coordinate outlet with spout and fixture receptor.

- 1. Maximum Flow Rate: 0.5 gpm]

- 2. Maximum Flow: 0.25 gal..

2.14 LAVATORY (LAV-2)

- A. Basin: ANSI A112.19.2; vitreous-china wall-hung lavatory 20" x 18-1/4", with 4-inch high back, center hole only, rectangular basin with splash lip, rear overflow; Refer to Fixture Schedule of Contract Documents for basis of design or equal.
- B. Trim: ANSI A112.18.1; chrome-plated supply fitting with open-grid strainer, water economy aerator, touchless sensor, chrome-plated 17-gauge brass P-trap with clean-out plug

and arm with escutcheon; Refer to Fixture Schedule of Contract Documents for basis of design or equal.

- C. Wall Mounted Carrier: ANSI A112.6.1; cast-iron and steel frame with tubular legs, lugs for floor and wall attachment, concealed arm supports, bearing plate and studs; Refer to Fixture Schedule of Contract Documents for basis of design or equal.
- D. Faucet: Single-control mixing valve. Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture holes; coordinate outlet with spout and fixture receptor.

1. Maximum Flow Rate: 0.5 gpm]

2. Maximum Flow: 0.25 gal..

2.15 SINK (S-1)

- A. Bowl: ANSI A112.19.3; single compartment 16-1/2" x 20-1/2" x 7-7/8" inch outside dimensions, 18-gauge Type 304 stainless steel, 3-1/2 inch crumb cups, and stainless-steel drain. Refer to Fixture Schedule of Contract Documents for basis of design or equal.
- B. Trim: ANSI A112.18.1; chrome-plated brass supply with swing spout, water-economy aerator, indexed lever handles; chrome-plated 17-gauge brass P-trap with clean-out plug and arm with escutcheon; Refer to Fixture Schedule of Contract Documents for basis of design or equal.
- C. Faucets: Kitchen faucet without spray, three-hole. Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture holes; coordinate outlet with spout and fixture receptor.
- D. Maximum Flow Rate: 2.2 gpm, unless otherwise indicated.

2.16 SINK (S-2)

- A. Bowl: 18" x 15" x 11" black onyx epoxy resin undermount sink with corner drain. Refer to Fixture Schedule of Contract Documents for basis of design or equal.
- B. Faucet: Concealed deck-mount, dual-inlet water faucet, 8" centers, with third-water inlet, polished chrome finish. 8" fixed centers. 5-1/4" rigid/swing gooseneck spout. Laboratory nozzle with 10 serrations for laboratory hose. 4" wristblade handles.

2.17 SINK (S-3)

- A. Bowl: ANSI A112.19.2; vitreous-china self-rimming undermount countertop lavatory, 16"-3/4" x 13-1/4" x 5-1/2" oval bowl with drillings on center hole, front overflow, seal of putty, caulking, or concealed vinyl gasket; Refer to Fixture Schedule of Contract Documents for basis of design or equal.

- B. Trim: ANSI 112.18.1; chrome-plated brass supply with swing spout, water economy aerator, single lever handle and retractable spray, chrome plated 17-gauge brass P-trap with clean-out plug and arm with escutcheon; Refer to Fixture Schedule of Contract Documents for basis of design or equal.
- C. Faucets: . Single-lever chrome faucet. Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture holes; coordinate outlet with spout and fixture receptor.
- D. Maximum Flow Rate: 1.2 gpm

2.18 SHOWER (SH)

- A. ADA transfer shower with reinforced walls, 38" x 38". Include grab bars, folding shower seat, slide bar with handheld shower, pressure balance valve, caulkless drain; Refer to Fixture Schedule of Contract Documents for basis of design or equal.

2.19 ELECTRIC WATER COOLER (EWC)

- A. Fountain: ARI 1010; surface-mounted bi-level electric water cooler with bottle filler, vinyl-on-steel body, elevated anti-squirt bubbler with stream guard, automatic stream regulator, mounting bracket, refrigerated with integral air-cooled condenser; capacity of 8 gal/hour of 50°F water with inlet at 80°F and room temperature of 90°F.

2.20 MOP SINK (MS-1)

- A. Bowl: 36 x 24 x 10-inch high white molded stone, floor mounted, with 1-inch wide shoulders, stainless-steel strainer; Refer to Fixture Schedule of Contract Documents for basis of design or equal.
- B. Trim: ANSI A112.18.1; exposed-wall-type supply with cross handles, spout wall brace, vacuum breaker, hose-end spout, strainers, eccentric adjustable inlets, integral screw-driver stops with covering caps and adjustable threaded wall flanges; 5 feet of 1/2-inch diameter plain-end reinforced rubber hose, hose clamp, mop hanger; Refer to Fixture Schedule of Contract Documents for basis of design or equal.

2.21 MOP SINK (MS-2)

- A. Bowl: 24 x 24 x 10-inch high white molded stone, floor mounted, with 1-inch wide shoulders, stainless-steel strainer; Refer to Fixture Schedule of Contract Documents for basis of design or equal.
- B. Trim: ANSI A112.18.1; exposed-wall-type supply with cross handles, spout wall brace, vacuum breaker, hose-end spout, strainers, eccentric adjustable inlets, integral screw-driver stops with covering caps and adjustable threaded wall flanges; 5 feet of 1/2-inch diameter plain-end reinforced rubber hose, hose clamp, mop hanger; Refer to Fixture Schedule of Contract Documents for basis of design or equal.

2.22 LAB SINK (LS-1)

- A. Bowl: 18" x 15" x 11" black onyx epoxy resin undermount sink with corner drain. Refer to Fixture Schedule of Contract Documents for basis of design or equal.
- B. Faucet: Concealed deck-mount, dual-inlet water faucet, 8" centers, with third-water inlet, polished chrome finish. 8" fixed centers. 5-1/4" rigid/swing gooseneck spout. Laboratory nozzle with 10 serrations for laboratory hose. 4" wrist blade handles.

2.23 SERVICE SINK (SS)

- A. Bowl: Custom fabricated, 18-gauge type 304 stainless steel, 36" x 18" x 10". Oversized drain with 3" airgap fitting. Refer to Fixture Schedule of Contract Documents for basis of design or equal.
- B. Faucets:
 - 1. Manufactures: Chicago Faucet model LWV4 or approved equal.
 - 2. Standard: ASME A112.18.1 and NSF/ANSI 61 & 372 for faucets
 - 3. Body Material: Polished chrome plated Stainless Steel.
 - 4. Seat: Bronze, replaceable.
 - 5. Handle: Butterfly knob or T Handle
 - 6. Supply Connections: NPS 3/4 threaded or solder-joint inlet.
 - 7. Outlet Connection: Garden-hose thread complying with ASME B1.20.7.
 - 8. Pressure Rating: 125 psig.
 - 9. Vacuum Breaker: Integral nonremovable, drainable, hose-connection vacuum breaker complying with ASSE 1011.

2.24 EMERGENCY SHOWER AND EYE/FACE WASH (ESEW-X)

- A. Indoor: ANSI Z358.1; Eye/Face wash - free-standing, self-cleaning, non-clogging eye and face wash with quick-opening, full-flow valves, stainless-steel eye and face wash receptor, twin eye-wash heads and face-spray ring, copper-alloy control valve and fittings. Showerhead - self-cleaning, non-clogging 8-inch diameter plastic deluge shower head with elbow, 1-inch full-flow valve with pull chain and 10-inch diameter ring, 1-inch inter-connecting fittings. Provide flow switch and horn/strobe with auxiliary contact to indicate activation of fixture. Refer to Fixture Schedule of Contract Documents for basis of design or equal.

- B. Outdoor recirculating: ANSI Z358.1; Eye/Face wash - free-standing, self-cleaning, non-clogging eye and face wash with quick-opening, full-flow valves, stainless-steel eye and face wash receptor, twin eye-wash heads and face-spray ring, copper-alloy control valve and fittings. Showerhead - self-cleaning, non-clogging 8-inch diameter plastic deluge shower head with elbow, 1-inch full-flow valve with pull chain and 10-inch diameter ring, 1-inch interconnecting fittings. Temperature control through thermostatically controlled heat traced cable and auxillary outlet for recirculating system. Provide additional heat trace wire option. Provide flow switch and horn/strobe with auxiliary contact to indicate activation of fixture. Refer to Fixture Schedule of Contract Documents for basis of design or equal.

PART 3 – EXECUTION

3.01 INSPECTION

- A. Review architectural woodwork Shop Drawings. Confirm location and size of fixtures and openings before rough-in and installation.
- B. Verify that adjacent construction is ready to receive rough-in work of this Section.

3.02 INSTALLATION

- A. Install each fixture with a trap that is easily removable for servicing and cleaning.
- B. Provide chrome-plated rigid or flexible supplies to fixtures with screwdriver stops, reducers, and escutcheons.
- C. Install components level and plumb
- D. Install and secure fixtures in place with [wall supports] [wall carriers] and bolts.
- E. Seal fixtures to wall and floor surfaces with sealant as specified in Division 07 Section "Joint Sealants", color to match fixture.
- F. Install fixtures to the following mounting heights above finished floor:

Water Closet	Standard	15 inches to top of bowl rim
	Handicapped	18 inches to top of seat
Urinal	Standard	22 inches to top of bowl rim
	Handicapped	19 inches to top of bowl rim
Lavatory	Standard	31 inches to top of basin rim
	Handicapped	32 inches to top of basin rim
Drinking Fountain	Standard	[30] [40] inches to top of basin rim

	Handicapped	36 inches to top of basin rim
Water Closet Flush Valves	Standard	11 inches minimum above bowl rim
	Recessed	10 inches minimum above bowl rim
Shower Heads	Adult [male]	69.5 inches to bottom of head
	Adult [female]	64.5 inches to bottom of head
	Child	58.5 inches to bottom of head
Emergency Eye [And Face] Wash	Standard	38 inches to receptor rim
Emergency Shower	Standard	84 inches to bottom of head

3.03 ADJUSTING AND CLEANING

- A. Adjust stops or valves for intended water-flow rate to fixtures without splashing, noise, or overflow.
- B. At completion, clean plumbing fixtures and equipment.
- C. Solidly attach water closets to floor with lag screws. Lead flashing is not intended hold fixture in place.

3.04 FIXTURE ROUGH-IN SCHEDULE

- A. Rough-in fixture piping connections in accordance with following table of minimum sizes for particular fixtures.

	Hot Water	Cold Water	Waste	Vent
Lavatory	1/2-inch	1/2-inch	1-1/2 inch	1-1/4 inch
Service Sink	1/2-inch	1/2-inch	2 inch	1-1/2 inch
Sink	1/2-inch	1/2-inch	1-1/2 inch	1-1/4 inch
Drinking Fountain	—	1/2-inch	1-1/4 inch	1-1/4 inch
Water Closet (Flush Valve)	—	1 inch	4 inch	2 inch
Water Closet (Tank Type)	—	1/2-inch	4 inch	2 inch
Urinal (Flush Valve)	—	3/4-inch	2 inch	1-1/2 inch
Urinal (Tank Type)	—	1/2-inch	2 inch	1-1/2 inch

END OF SECTION

SECTION 40 05 68.23
MISCELLANEOUS VALVES

PART 1 – GENERAL

1.01 THE REQUIREMENT

- A. Reference Section 40 05 00 – Basic Mechanical Requirements.
- B. Valves intended for chemical service shall be constructed of materials suitable for the intended service.

PART 2 – PRODUCTS

2.01 GLOBE VALVES

- A. Bronze Body (GLV-B)
 - 1. ½-Inch to 3-Inch
 - a. Globe valves for compressed air or water service shall be bronze body and bonnet with brass stem and stainless steel regrindable disc plug. Rising stem and union bonnet through 2-Inch and bolted bonnet to 3-Inch. Valves shall be Jenkins Valve Fig. 2032J, Crane Co., or equal with minimum 300 psi non-shock cold water pressure rating and screwed ends.

2.02 SOLENOID VALVES

- A. Two-Way (SV-2W)
 - 1. Two-way solenoid valves shall be normally closed and shall open when the solenoid is energized, unless otherwise noted. The valve shall be of forged brass-body and bonnet with a BUNA "N" diaphragm and screwed ends. The solenoid's internal parts shall be of 300 and 400 series stainless steel. The valve shall have a safe body working pressure of 125 psi, and shall be as manufactured by ASCO Valves, Automatic Switch Co., or equal, for 120-volt, 60 Hz, single phase operation. Solenoid enclosure shall be NEMA 4 watertight.

2.03 BACKFLOW PREVENTION VALVES

- A. Double Check Style (BFPV-DC)
 - 1. Backflow preventer shall be the size shown on the Drawings and shall be of the double check valve principle. Backflow preventer installation shall include isolation valves and four test cocks, furnished as an assembly. For backflow preventers

less than 2-1/2", the installation assembly also shall include a strainer. Isolation valves for backflow preventers shall be ball valves, except for size 2-1/2" and larger which shall be resilient seat gate valves. Test cocks shall be located as recommended by the manufacturer to facilitate functional testing of the assembly. The backflow preventer shall be as follows.

- a. Backflow preventers for pipe sizes 1/2" to 2" shall be a WATTS LF007, or equal.
- b. Backflow preventers for pipe sizes 2 1/2" to 10" shall be a WATTS 709, or equal.
- c. Backflow preventers for 12" pipe shall be a WATTS 774, or equal.

B. Reduced Pressure Style (BFPV-RP)

1. Reduced Pressure Backflow Preventer shall be of the size shown on the Drawings and shall be of the reduced pressure principle type in accordance with AWWA Standards C510 and C511, with two (2) independent operating spring-loaded check valves and one (1) spring loaded, diaphragm actuated, differential pressure relief valve shall be installed between the check valves. Backflow preventer shall be bronze body construction, with EPT rubber discs and Buna-N and nylon diaphragm. Screws and springs shall be of stainless steel. End connections shall be screwed, unless otherwise specified or shown on the Drawings. Reduced pressure backflow preventer installations shall include isolation valves and four test cocks, furnished as an assembly. For reduced pressure backflow preventers less than 2-1/2" the installation assembly also shall include a strainer. Isolation valves for reduced pressure backflow preventers shall be ball valves, except for sizes 2-1/2" and larger which shall be resilient seat gate valves. Test cocks shall be located as recommended by the manufacturer to facilitate functional testing of the assembly. The reduced pressure backflow preventer shall be as manufactured by Beeco Division, Hersey Products Inc., Aergap Model 6CM, WATTS 909, or equal.

2.04 PRESSURE RELIEF, REDUCING AND REGULATING VALVES

A. Pressure Relief Valve (PRV)

1. Pressure relief valves 1 inch and under shall have bronze bodies and above 1 inch shall have cast iron bodies, bronze fitted with grey iron diaphragm base and straight chamber and phosphorus bronze diaphragm. The ratio of the diaphragm area to the seat area shall be adequate to overcome sticking. The seat disc shall be of non-corrodible, non-sticking material capable of withstanding extreme temperatures. Valves shall permit dismantling for repairs and cleaning without being removed from the line. Valves shall conform to the ASME Boiler Construction Code as approved by both the Underwriters Lab., and the National

Board of Boiler Pressure Vessel Inspectors. All valves shall be designed for a minimum working pressure at least equal to the working pressure of the corresponding pipeline and shall have adjustment over a range of at least 20 percent above or below the required setting pressure of the installation.

2. Pressure relief valves (non-potable water service) shall be diaphragm activated, single seat, pilot operated and shall maintain a constant upstream pressure by relieving excess pressure. The valve shall be normally closed and shall open to maintain the required back pressure when the valve inlet pressure reaches the pilot control set point. The initial pilot control setting shall be 78 psi. The stem shall be stainless steel and shall be guided through the center for 100% of the stem travel. The main valve throttling plug shall be provided with V-port sections to insure precise control at low flow rates. All internal metal parts shall be bronze or stainless steel. The control pilot shall be direct acting, spring loaded, and adjustable with bronze body and stainless steel trim. The diaphragm and seat disc shall be BUNA-N. The valve shall be of the angle or globe pattern as shown on the Drawings and shall be fully repairable in the line. The pressure relief valve shall be the Model 50-01 as manufactured by CLA-VAL, or equal.

B. Pressure Reducing and Regulating Valves

1. Pressure reducing and regulating valves (water service) 1/2inch and under shall be lead-free brass and above 1/2inch shall have cast iron bodies bronze fitted. Valves shall be constructed with full openings and capable of supplying a full flow of water at reduced pressure. Valves shall be so constructed that repairs can be made without removing the valves from the line. Pressure reducing and regulating valves shall be the back pressure sustaining type and shall operate over a range at differential pressures from 5 to 120 psi. Reducing and regulating valves shall meet or exceed the requirements of ASSE 1003 (ANSI A112.26.2) and units installed on settled, filtered, CCB and finished water lines shall be WATTS model LF263A or engineer approved equal. Units installed on raw and coagulated water lines shall be WATTS model LFU5B-LP or engineer approved equal.

Pressure Regulating Valve Location	Discharge of Sample Line Branch	Minimum downstream pressure setting (psi)
Sample Panel A or B	Admin Laboratory	18
Sample Panel A or B	Analyzer room/Operator Laboratory	11
Analyzer Room	Analyzer	1

2.05 HOSE VALVES (HV)

- A. Hose valves shall be 300 lbs. non-shock cold water angle or globe valves, Fig. 112/113 as manufactured by Jenkins Valve Co., or equal. Valves shall be bronze bodied with BunaN or neoprene disc and bronze bonnet and packing nut. Valve stem, gland, and lock nut shall be brass. Valve shall be provided with 3-inch diameter malleable iron handwheel, cap and chain, and 3/4inch or 1inch (or 2-inch near flushing connections) hose connection outlet.

2.06 NEEDLE VALVES (NV)

- A. Needle valves shall be bronze body and spindle with follower gland and shall be 400 psi, non-shock cold water needle valves, Figure 743-G as manufactured by Jenkins Bros., Corp., Crane Co. No. 88, or equal.
- B. Needle valves (service air) shall be bronze body, with stainless steel stem. Valves shall be Jenkins Valve Fig. 741G, Crane Co. or equal and shall have minimum 400 psi non-shock cold water pressure rating and screwed ends.

END OF SECTION